

Appendix A

TEST PLAN



Plan for Hemyc (1-Hour) and M.T. (3-Hour) Electrical Raceway Fire Barrier Systems Performance Testing

Revision M
April 8, 2005

1 PURPOSE AND SCOPE

Section 50.48, “Fire Protection,” of 10 CFR Part 50 requires that each operating nuclear power plant have a fire protection plan that satisfies General Design Criterion 3 of Appendix A to 10 CFR Part 50. Criterion 3 requires that structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room. Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Firefighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components. Section 50.48 also requires that all plants with operating licenses issued prior to January 1, 1979, satisfy the requirements of Sections III.G, III.J, and III.O of Appendix R to 10 CFR Part 50. (Post 1979 plants (per 10 CFR Part 50.48) have to comply with the provisions of their licenses.)

Section III.G of Appendix R, which addresses fire protection of safe shutdown capability, requires that fire protection features be provided such that one train of systems necessary to achieve hot shutdown conditions remains free of fire damage. One acceptable means of satisfying this requirement is to separate cables and equipment and associated non-safety circuits of redundant systems necessary to achieve and maintain hot shutdown conditions located in the same fire area by a fire barrier having a 3-hour fire rating (Section III.G.2.a). Another means is to enclose cables and equipment and associated

non-safety circuits of one redundant train in a fire barrier having a 1-hour fire rating and install fire detectors and an automatic fire suppression system in the fire area (Section III.G.2.c).

The scope of this document is to describe the overall plan for investigating the fire resistance rating of Hemyc (1-hour) and M.T. (3-hour) electrical raceway fire barrier systems (ERFBS). The primary approach will be to perform a series of ASTM E 119 furnace tests on a number of cable raceway types that are protected by either the Hemyc (with and without air gaps) or M.T. fire barrier material. The Hemyc tests will be performed for a period of 60-minutes each, followed by a hose stream test and post-test visual inspection of the ERFBS. The M.T. test will be performed in a similar manner with the principal difference being that it will be conducted for a period of 3-hours. Descriptions of these tests and of the overall approach are provided below.

2 OBJECTIVE

The objective of this program is to assess the fire resistance rating of Hemyc and M.T. ERFBS by subjecting various test specimens (conduit, cable trays, cable drops, and junction boxes) to standard temperature-time conditions as specified in ASTM E 119 and criterion stipulated in GL 86-10, Supplement 1. The types and characteristics of the ERFBS enclosing the test specimens are intended to simulate as-installed configurations.

These tests will also provide additional data in that redundant conduits loaded to their maximum capacities with cables will be included in two of the test runs. Also, a few support structure analogs partially enclosed in the ERFBS will be exposed to the one- and three-hour test conditions.

3 APPROACH

The following sections describe the test specimens and the test conditions to be employed for the performance assessments of the Hemyc and M.T. electrical raceway fire barrier systems.

3.1 Test Specimens

The principal test specimens will include a variety of cable raceway types protected by either the Hemyc 1-hour rated ERFBS or M.T. 3-hour rated ERFBS. In one test, the test specimens will be protected with Hemyc fire barrier material directly attached to the raceway (i.e., without air gaps). The test specimens in the second test will include a mix of test specimen enclosure methods: some protected by Hemyc ERFBS framed with structural supports to provide a 5-cm (2 in) air gap between the ERFBS and the raceway and others protected with Hemyc by direct attachment. For the third test, the test specimens (of the same types included in the first test) will be protected with the M.T. ERFBS (directly attached to the raceways) and subjected to a 3-hour ASTM E 119 furnace exposure.

The types of test specimens and the configurations of the ERFBS selected for these tests are based principally on the application usage information provided to the NRC/NRR by industry (Letter: Emerson, NEI, to Frumkin, NRC/NRR, “Promatec Hemyc 1-Hour and M.T. 3-Hour Fire Barrier Systems,” December 28, 2001 and via letter: Marion, NEI, to Hannon, NRC/NRR, “Comments on NRC Hemyc Test Plan,” December 6, 2002). Additional correspondence addressing specific details about industry practices in Hemyc applications were also taken into account and, where practical, incorporated into the test plan (e.g., Email: Emerson, NEI, to Salley, NRC/RES, “Hemyc – Predominant Industry Practices,” January 18, 2005 [a copy of this message is provided in Appendix B]).

The test protocols presented here are intended to provide bounding states of the protective material performance under standard test conditions. Also, this method is per NRC guidance, as stated in Generic Letter 86-10, Supplement 1, and represents current staff positions on bounding test approaches. Additionally, it is also required that the assembly and installation of the Hemyc and M.T. ERFBS shall be done in accordance with the vendor’s specifications and meet all required vendor quality standards.

The test specimens will include the following items:

- 27-mm (1 in) Steel rigid metal conduit (RMC) arranged in a modified “U” configuration such that one vertical leg and one end of the horizontal span of the conduit intersect at a condolet LB access fitting, forming a right angle, while the other end of the horizontal span transitions to the second vertical leg via a conduit radius bend or elbow. Tests will be conducted on both “empty” and “loaded”¹ conduit configurations.
- 63-mm (2½ in) Steel rigid metal conduit (RMC) arranged in a modified “U” configuration such that one vertical leg and one end of the horizontal span of the conduit intersect at a condolet LB access fitting, forming a right angle, while the other end of the horizontal span will transition to the second vertical leg by means of a conduit radius bend or elbow. Both “empty” and “loaded” conduit configurations will be tested.
- 103-mm (4 in) Steel rigid metal conduit (RMC) arranged in a modified “U” configuration such that one vertical leg and one end of the horizontal span of the conduit intersect at a condolet LB access fitting, forming a right angle, while the other end of the horizontal span will transition to the second vertical leg through a conduit radius bend or elbow. Again, “empty” and “loaded” conduit configurations will be tested.
- A 305-mm (12 in) wide 16-gage galvanized steel ladder-back cable tray with 10 cm (4 in) high side rails and 23 cm (9 in) rung spacing. The cable tray will be constructed in a modified “U” configuration such that one vertical leg and one end of the horizontal span of the conduit intersect at a right angle, while the other end of the horizontal span will transition to the second vertical leg by means of a tray vertical curve. Only empty cable trays will undergo testing.
- A 914-mm (36 in) wide 16-gage galvanized steel ladder-back cable tray with 10 cm (4 in) high side rails and 23 cm (9 in) rung spacing. The cable tray will be constructed in a modified “U” configuration such that one vertical leg and one end of the horizontal span of the conduit intersect at a right angle, while the other end of the horizontal span will transition to the second vertical leg by means of a tray vertical curve. The cable trays will be tested without cables.
- Short cable drops consisting of a small bundle of No. 8 AWG bare copper wire suspended from the top of the furnace in a “U” loop configuration to simulate air drops.
- 46 cm x 61 cm x 20 cm (18" x 24" x 8") Steel junction boxes. The junction boxes will be suspended using supports protected by the ERFBS through direct attachment.
- Four separate support structure test elements consisting of two different cross sections (Unistrut® and square steel tube) formed into a right angle (“L”)

¹ “Loaded” refers to approximately 30% of cross sectional area fill using bare #8 copper wires.

configuration and partially covered by the ERFBS. These structures are being included in the test program to evaluate the magnitude of heat transmission along their wrapped length and the possible thermal coupling effect on any supported assemblies or intervening items.

A bare #8 stranded copper wire, instrumented with thermocouples along its length, will be routed through each of the conduit test specimens and placed along the horizontal center of the cable tray test specimens and attached to the bottom of the rungs. The thermocouples will be mechanically attached to the bare copper conductor at 150-mm (6 in) spacing intervals. Additional thermocouples will be mechanically attached to the outer surfaces of the conduit test specimens and along the length of both side rails of the cable tray test specimens at 150-mm (6 in) intervals. The ends of the test specimens will be insulated with fiber filler inside and around their perimeters at the furnace-ceiling interface in accordance with the vendor's requirements.

The Hemyc ERFBS consists of blankets constructed of 38-mm (1.5 in) or 50-mm (2 in) thick, 128 kg/m³ (8 lb/cu ft), JM Cerablanket/B&W Kaowool blanket covered with Refrasil fabric mesh on all surfaces exposed to the fire². The materials are sewn together with "Astroquartz" thread. The cable tray and cable drop test specimens framed to support a 50-mm (2 in) air gap will use the 38-mm thick Hemyc covers and all direct attachment configurations will use the 50-mm thick wraps. All installation shall be in accordance with the vendor's requirements.

The M.T. three-hour ERFBS is virtually identical in concept and uses the same basic materials in construction as Hemyc, but the M.T. also has an internal layer of a heat-activated compound.

PCI Promatec, Inc. has been contracted to fabricate and install the Hemyc and M.T. materials on all of the test specimens.

² Previous versions of this test plan called for the use of Siltemp 84CH and 84SR fabric, however the manufacturer of Siltemp is no longer in business and Siltemp is no longer manufactured. Refrasil is an approved material for the fabrication of Promatec protective wrap components and will thus be used as the outer fabric for the Hemyc barriers for these tests.

Table 1 presents the test conditions to be investigated in terms of ERFBS type and configuration for each of the test specimens during the three tests. Conduits will not be tested in the air gap framed configuration and no cable trays will be tested with M.T.

Detailed construction drawings of each of the test specimens are provided in the appendix to this plan. The drawings define the specific details of the design and assembly of each test specimen. Promatec will provide separate drawings detailing the installation of the designated ERFBS. Drawings and descriptions of the dimensions and setup configurations in the furnace and instrumentation details are provided. The fabrication and installation of the ERFBS will be performed in accordance with vendor procedures. Provisions will be made to verify that all material/installation quality requirements are met.

Table 1: Test Matrix

	Test #1	Test #2	Test #3
	Hemyc (1-Hour, Direct Attachment)	Hemyc (1-Hour, Framed for Air Gap and Direct Attachment)	M.T. (3-Hour, Direct Attachment)
27-mm (1-in) Conduit ¹	X	(Not included)	X
63-mm (2½-in) Conduit ¹	X	(Not included)	X
103-mm (4-in) Conduit ¹	X	(Not included)	X
305-mm (12-in) Tray	(Not included)	X	(Not included)
914-mm (36-in) Tray	(Not included)	X	(Not included)
Junction Box ²	X	X	X
Cable Drop	(Not included)	X	X
Unistrut Support	X	(Not included)	X
Tube Steel Support	X	(Not included)	X

¹ Conduit test specimens will be tested under both "empty" and "loaded-with-cable" conditions.

² Only a single junction box will be included in Test #2 that will be enclosed in Hemyc by Direct Attachment secured with metal bands.

Sandia National Laboratories will procure the required materials for the test specimens. The type of material and equipment obtained will include raceways (conduit, trays,

condolets, and junction boxes), metal to fabricate the support structure specimens, and miscellaneous hardware (nuts, bolts, screws, etc.) plus spare parts. Promatec will be responsible for QA of the Hemyc and M.T. materials and ERFBS installation.

The test laboratory will construct the test specimens in accordance with the detailed construction drawings. The process will include the positive mechanical fastening of the thermocouples to the outer surfaces of the test specimens and checkout for proper operation prior to the installation of the ERFBS. The test laboratory will also be responsible for installation of the instrumented bare #8 copper wire and the additional conductors within the raceways. Table 2 indicates the number of bare #8 conductors to be installed in the “loaded” conduit test specimens. The individual weights of the assembled, but empty, test specimens will be recorded prior to attachment to the test deck. Similarly, the weights of the bare #8 copper wire bundles will also be recorded prior to installation in the selected conduits. The resulting mass per unit length will be used as a first-order basis for determining the influence of cable loading on thermal response of the raceways. The test laboratory will be responsible for QA of the furnace temperatures and test operations. The laboratory will provide logs and record instrument data during the tests.

Table 2: Number of No. 8 Bare Conductors Routed in Loaded Conduit.

Loaded Test Specimens	No. bare #8 stranded wires	Approximate mass per unit length of wire
103-mm (4") Conduit	291	21.72 kg/m (14.58 lb/ft)
63-mm (2½") Conduit	113	8.45 kg/m (5.68 lb/ft)
27-mm (1") Conduit	18	1.38 kg/m (0.95 lb/ft)
Cable Drops	7	0.70 kg/m (0.50 lb/ft)

Photographs and documented written logs of the test specimens, both during and after assembly, shall be prepared by the testing laboratory prior to testing and included as part of the test QA documentation for the final test report.

PCI Promatec, Inc., through a contract with Sandia National Laboratories, will be responsible for fabricating and installing the ERFBS materials on the test specimens following construction, instrumentation and mounting on the test deck.

3.2 Assessment Criteria

The test specimens will be subjected to the ASTM E 119 temperature-time profile in the test furnace. An assessment of the ERFBS performance will be based on two principal factors, as stated in Generic Letter 86-10, Supplement 1:

1. *The time at which the average unexposed side temperature of the fire barrier system, as measured on the exterior surface of the raceway or component, exceeds 139 C (250 F) above its initial temperature. Or the time at which a single temperature reading of a test specimen exceeds 30% of the maximum allowable temperature rise (i.e., 181 C [325 F]) above its initial temperature.*
2. *The fire barrier system remains intact during the fire exposure and water hose stream test without developing any openings through which the cable raceway is visible.*

3.3 Test Facilities

The furnace tests will be conducted at Omega Point Laboratories (OPL), located in Elmendorf, Texas. OPL has a full-scale horizontal furnace that fully satisfies the requirements of this test plan. It is 3.7 m (12 ft) wide by 5.5 m (18 ft) long and 2.1 m (7 ft) deep equipped with twelve propane burners. The furnace has been demonstrated to produce the ASTM E 119 standard time-temperature profile.

The test furnace is located in a 18 m (60 ft) by 61 m (200 ft) by 9 m (30 ft) high building. This building has ample room for test specimen assembly and fire barrier installation activities prior to placement inside the furnace.

3.4 Primary Tests

Three separate test runs will be conducted as part of the primary test series. Two of the tests will test the performance of 1-hour rated Hemyc ERFBS and the third test will assess the performance of 3-hour rated M.T. ERFBS. All of the primary tests will be conducted using the ASTM E 119 standard time-temperature curve (Figure 1). The furnace calibration shall be within ASTM E 119 requirements and the calibration documentation included in the final test report. All thermocouples used in the testing (furnace and test specimens) shall be within ASTM E 119 requirements and the calibration documentation included in the final report.

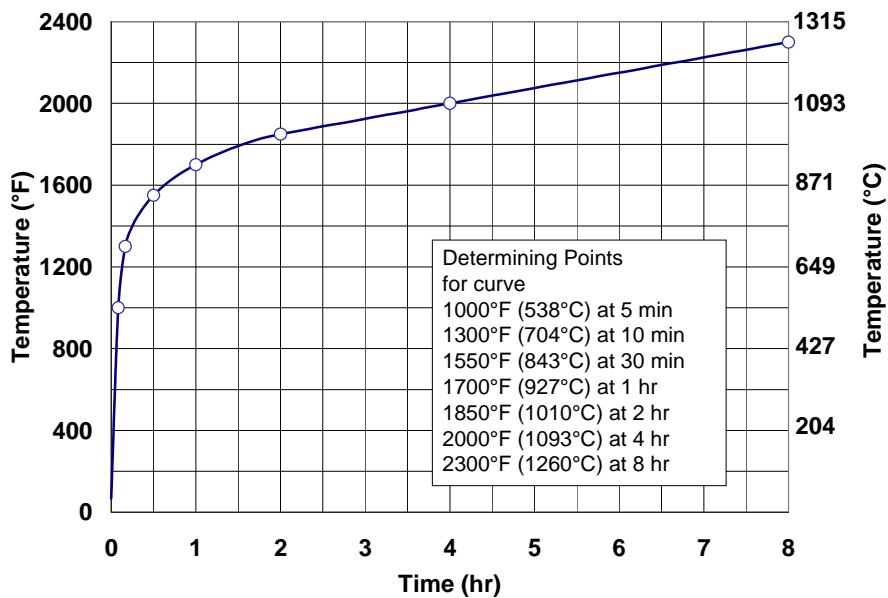


Figure 1. The Standard Time-Temperature Curve (based on data provided in ASTM E 119 – 00a).

As indicated above, these tests will be governed by the conditions provided in this test plan. The test specimens will consist of those items described in Section 3.1. The specific setup and configuration for each test is discussed below.

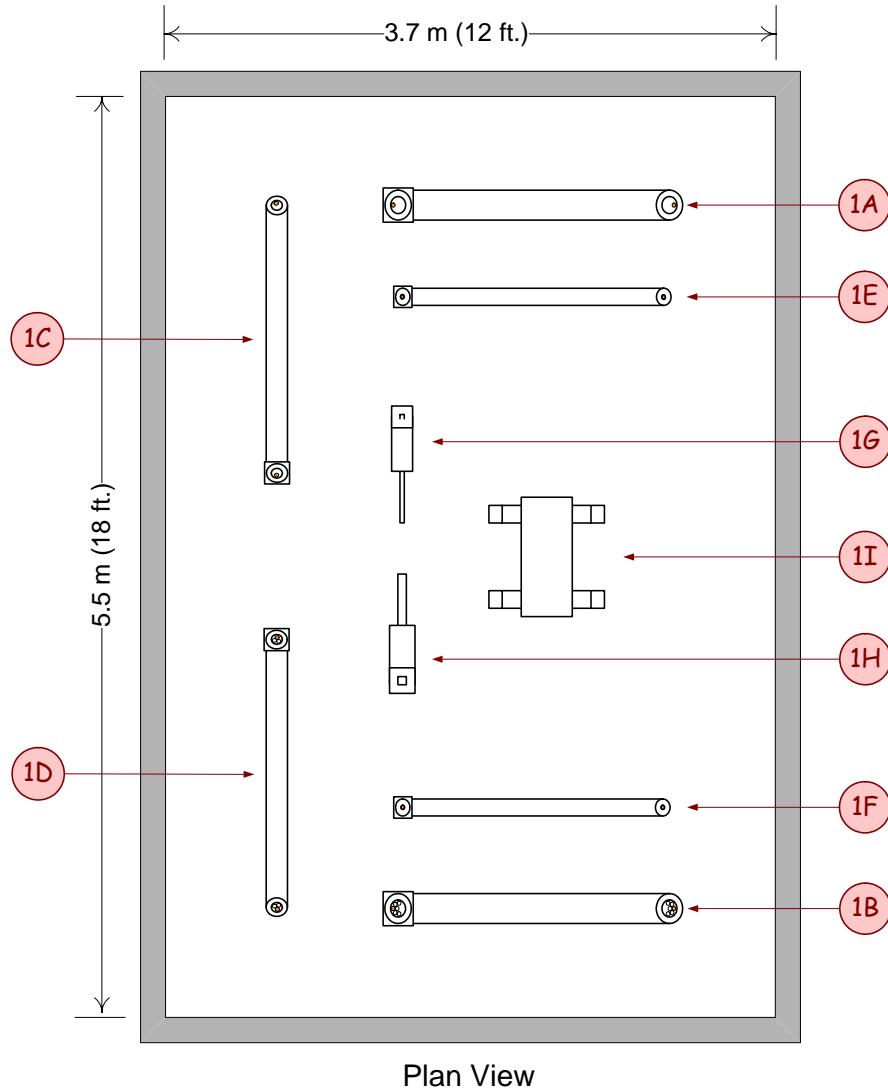
The Hemyc material will use Refrasil fabric on both the internal and external covering. Stainless steel bands will be used for attachment (i.e., no finger straps will be used). The spacing of the bands will be per Promatec's maximum spacing requirements. Standard 96 – 128 kg/m³ (6 – 8 lb/ft³) density ceramic fiber material will be used to construct the Hemyc wraps. The 27-mm (1-in) empty conduit, 63-mm (2½-in) loaded conduit and the 103-mm (4-in) conduit (empty and loaded) will all employ butt joints with 150-mm (6 in) wide collar over wraps. The 27-mm (1-in) loaded conduit and the 63-mm (2½-in) empty conduit will employ 50-mm (2-in) overlap joints. All cable trays will use the overlap joint method. In addition, the cable drop with the 50-mm (2-in) air gap will use the overlap method for sealing the material joints while the cable drop without the air gap will use collars to cover the butt joints.

3.4.1 Test #1

The first test of the series will be conducted on nine test specimens with Hemyc ERFBS directly attached to the raceways (i.e., without framework to provide air gaps between the fire barrier material and raceways). The nominal thickness of the Hemyc will be 50 mm (2 in).

Figure 2 shows one possible configuration of the test specimens inside the furnace. As indicated in the figure, the test specimens include:

- A 103-mm (4 in) conduit without additional cables,
- A 103-mm (4 in) conduit loaded with the maximum (30% of conduit's cross-sectional area) fill of cables,
- A 27-mm (1 in) conduit and condolet LB assembly without cables,
- A 27-mm (1 in) conduit and condolet LB assembly with additional cables (30% fill),
- A 63-mm (2½ in) conduit and condolet LB assembly with no cables,
- A 63-mm (2½ in) conduit and condolet LB assembly with cables (30% fill),
- A 46 cm X 61 cm X 20 cm (18" x 24" x 8") junction box,
- A partially protected Unistrut® support assembly, and
- A partially protected 5 cm x 5 cm (2" x 2") square steel tube support assembly



Test #1 Configuration Layout Test Specimens Direct Attachment with Hemyc

1A - 103 mm (4") Conduit (0% Fill)	1F - 27 mm (1") Conduit (30% Fill)
1B - 103 mm (4") Conduit (30% Fill)	1G - Unistrut Support
1C - 63 mm (2 1/2") Conduit (0% Fill)	1H - 5 cm X 5 cm (2" X 2") Tube Steel Support
1D - 63 mm (2 1/2") Conduit (30% Fill)	1I - 46 cm X 61 cm X 20 cm (18" X 24" X 8") Junction Box
1E - 27 mm (1") Conduit (0% Fill)	

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Figure 2. Example of Test Specimen Layout during Test #1 (Hemyc, Direct Attachment Configurations).

This arrangement of the test specimens is intended to maximize thermal exposures and minimize the potential for one specimen to influence the response of another specimen to the thermal environment (i.e., minimize shadowing).

The conduit will be supported from the furnace ceiling in a modified “U” configuration. The metal test deck will be adequately insulated to prevent interaction with the portion of the test specimens located outside the furnace and to protect the metal deck from structural failure during the 1-hour test. Each conduit will include one sharp 90-degree transition from the horizontal span to one of the vertical legs; a condolet fitting will be employed to provide the right angle transition from horizontal to vertical. At the other transition point a radius bend will be used. The two vertical runs of these test articles will be approximately 0.9 m (36 in) along each leg and the horizontal span will be approximately 1.5 m (60 in) (See Figures A1, A2, and A3 in Appendix A). The ERFBS will completely cover the test specimens within the furnace and extend through the test deck for a distance of 15 to 30 cm (6 – 12 in) above the test deck (See Figure A19 in Appendix A). All raceway supports shall be outside the furnace and shall not interfere with the ERFBS during testing.

A Hemyc ERFBS will be directly attached to the support structure analogs such that 30 cm (12 in) of their horizontal sections are exposed to the furnace environment. The junction box will be suspended from the test deck by Unistrut support members and protected with Hemyc through direct attachment (See figure A6 in Appendix A).

The vertical run of the Unistrut will be approximately 0.9 m (36 in) inside the furnace and the horizontal run will be 0.6 m (24 in) (See figure A8 in Appendix A).

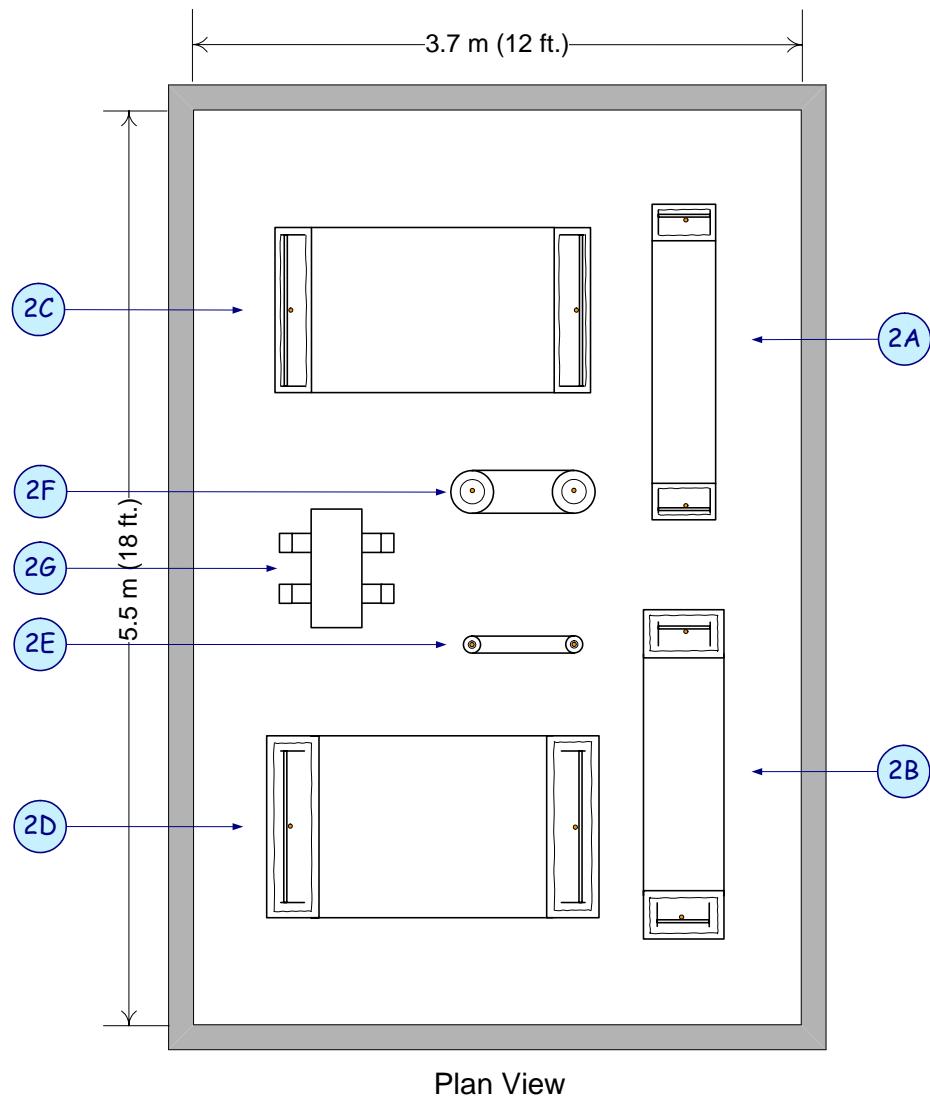
The vertical run of the 5 cm x 5 cm (2 in. x 2 in) tube steel will be approximately 0.9 m (36 in) below the test deck and the horizontal run will be 0.6 m (24 in) (See figure A7 in Appendix A).

3.4.2 Test #2

The second test will be conducted on seven test specimens, which will be protected with Hemyc ERFBS. Two of the cable trays and one cable drop will incorporate the necessary framework to provide a minimum of 50-mm (2 in) air gaps between the ERFBS and item. The nominal thickness of the Hemyc ERFBS enclosing the framed components will be 38 mm (1½ in). The remaining two cable trays, cable drop and junction box will be protected with directly attached (i.e., without air gap framework) Hemyc with a nominal wrap thickness of 50-mm (2 in).

One possible arrangement of the test specimens in the furnace during Test #2 is shown in Figure 3. The seven test specimens will include:

- A 914-mm (36 in) cable tray framed for 50-mm (2") air gap,
- A 914-mm (36 in) cable tray employing direct attachment of the Hemyc,
- A 305-mm (12 in) cable tray framed for 50-mm air gap,
- A 305-mm (12 in) cable tray employing direct attachment of the Hemyc,
- A small cable drop loop employing direct attachment of the Hemyc,
- A 46 cm x 61 cm x 20 cm (18" x 24" x 8") junction box employing direct attachment of the Hemyc suspended from the top of the furnace with separately protected (direct attachment, ceramic fiber blanket) supports, and
- A small cable drop loop framed for 50-mm air gap.



**Test #2 Configuration Layout
Test Specimens Protected in Hemyc**

- 2A - 305 mm (12") Cable Tray (direct attachment)
- 2B - 305 mm (12") Cable Tray (5 cm [2"] Air Gap)
- 2C - 914 mm (36") Cable Tray (direct attachment)
- 2D - 914 mm (36") Cable Tray (5 cm [2"] Air Gap)
- 2E - Cable Drop Loop (direct attachment)
- 2F - Cable Drop Loop (5 cm [2"] Air Gap)
- 2G - 46 cm X 61 cm X 20 cm (18" X 24" X 8") Junction Box (suspended by supports, enclosed in Hemyc by direct attachment)

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Figure 3. Example of Test Specimen Layout during Test #2 (Hemyc, Framed for 50-mm (2") Air Gap and Direct Attachment Configurations).

The cable trays will be supported from the furnace ceiling in a modified “U” configuration. The metal test deck of the test specimens will be adequately insulated to prevent interaction with the portion of the test specimens located outside the furnace and to protect the metal deck from structural failure during the 1-hour test. Each tray will include one sharp 90-degree transition from the horizontal span to one of the vertical legs. At the other transition a radius bend will be used. The cable trays will be modified and assembled to accommodate the right angle turn. The two vertical runs of these test articles will be approximately 0.9 m (36 in) along each leg inside the furnace and the horizontal span will be approximately 1.5 m (60 in) (See Figures A4 and A5 in Appendix A). The ERFBS will completely cover the test specimens within the furnace and extend through the test deck for a distance of 15 to 30 cm (6 – 12 in) above the test deck (See Figure A20 in Appendix A). All raceway supports shall be outside the furnace and shall not interfere with the ERFBS during testing.

The junction box will be supported from the furnace ceiling by Unistrut® channels (See Figure A6 in Appendix A). The junction box supports will be directly protected with a ceramic fiber blanket separately from the box.³ (Note: The junction box supports are not considered as part of this test and will not be instrumented; however any failure in their performance during the test will be noted and investigated as deemed appropriate.) Two wrapped cable bundles (one with air gap, the other without) will be dropped through the top of the furnace and looped in the furnace and routed back up through the test deck (See figure A9 in Appendix A).

3.4.3 Test #3

The final test will be conducted on ten test specimens, all of which will be wrapped with the M.T. 3-hour rated ERFBS without any framework to provide air gaps between the wrap and raceway. The nominal thickness of the M.T. ERFBS will be approximately

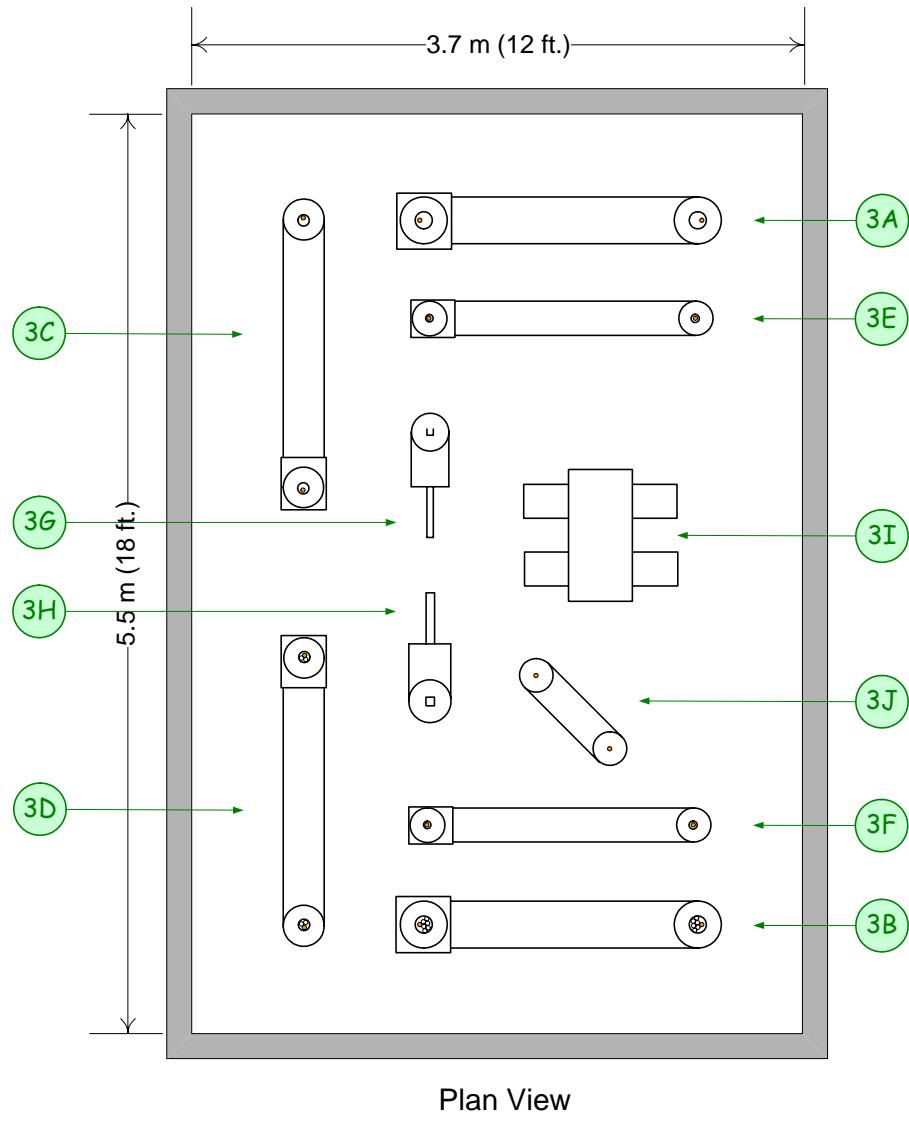
³ The junction box supports were protected with 50-mm (2") thick raw ceramic fiber blankets (not Hemyc) in Test #2 and kept thermally isolated from the box.

133 mm (5¼ in) for the cable drop. The nominal M.T. thickness for conduits and junction boxes will be 95 mm (3¾ in).

Figure 4 shows a possible configuration of the test specimens in the furnace during Test 3. The test specimens protected with M.T. during Test #3 will include:

- A 103-mm (4 in) conduit without additional cables,
- A 103-mm (4 in) conduit loaded with the maximum fill (30%) of cables,
- A 27-mm (1 in) conduit and condolet LB assembly without cables,
- A 27-mm (1 in) conduit and condolet LB assembly with additional cables (30% fill),
- A 63-mm (2½ in) conduit and condolet LB assembly with no cables,
- A 63-mm (2½ in) conduit and condolet LB assembly with cables (30% fill),
- A small cable drop loop,
- A partially protected Unistrut® support assembly,
- A partially protected 5 cm x 5 cm (2" x 2") square steel tube support assembly, and
- A 46 cm X 61 cm X 20 cm (18" x 24" x 8") junction box

As in the other two tests, the conduit assemblies will be supported from the furnace ceiling in a modified "U" configuration. The metal deck of the test specimens will be adequately insulated to prevent interaction with the portion of the test specimens located outside the furnace and to protect the metal deck from structural failure during the 3-hour test. Each conduit will include one sharp 90-degree transition from the horizontal span to one of the vertical legs and a radius bend will be used for the other transition. A condolet fitting will be employed to provide the right angle turn. The two vertical runs of these test articles will be approximately 0.9 m (36 in) along each leg inside the furnace and the horizontal run will be approximately 1.5 m (60 in) (See Figures A1, A2, and A3 in Appendix A). The ERFBS will completely cover the test specimens within the furnace and extend through the test deck for a distance of 15 to 30 cm (6 – 12 in) above the test deck (See Figure A19 in Appendix A). All raceway supports shall be outside the furnace and shall not interfere with the ERFBS during testing.



Plan View

**Test #3 Configuration Layout
Test Specimens Direct Wrap with M.T.**

3A - 103 mm (4") Conduit (0% Fill)
3B - 103 mm (4") Conduit (30% Fill)
3C - 63 mm (2½") Conduit (0% Fill)
3D - 63 mm (2½") Conduit (30% Fill)
3E - 27 mm (1") Conduit (0% Fill)

3F - 27 mm (1") Conduit (30% Fill)
3G - Unistrut Support Structure
3H - 5 cm X 5 cm (2" X 2") Steel Support Structure
3I - 46 cm X 61 cm X 20 cm (18" X 24" X 8") J-Box
3J - #8 AWG Bare Copper Wire Drop

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Figure 4. Example of Test Specimen Layout during Test #3 (M.T., Direct Wrap Configurations).

An M.T. ERFBS will be directly attached to the support structure analogs such that 30 cm (12 in) of their horizontal sections are exposed to the furnace environment. The junction box will be suspended from the test deck by Unistrut support members and protected with M.T. through direct attachment (See figure A6 in Appendix A).

The vertical run of the Unistrut will be approximately 0.9 m (36 in) within the furnace and the horizontal run will be 0.6 m (24 in) (See figure A8 in Appendix A).

The vertical run of the 5 cm x 5 cm (2 in. x 2 in) tube steel will be 0.9 m (36 in) in the furnace and the horizontal run will be 0.6 m (24 in) (See figure A7 in Appendix A).

One wrapped cable bundle will be dropped through the top of the furnace and looped in the furnace and routed back up through the test deck (See figure A9 in Appendix A).

3.5 Conduct of Tests

Each of the primary test runs will be conducted by exposing the test specimens to the time-temperature curve (Fig. 1) as specified in ASTM E 119, Standard Test Methods for Fire Tests of Building Construction and Materials. By this method, the temperature inside the furnace should reach 927 C (1700 F) at the end of the one-hour tests and 1052 C (1925 F) at the end of the 3-hour test. Figure 1 shows the desired temperature profile as a function of time. The time-temperature curve shall be maintained within the limits established in ASTM E 119.

Upon completion of each ASTM E 119 temperature run (one-hour and three-hours), the complete test assembly will be removed from the furnace and a hose stream will be applied to all of the test articles. The hose stream test will consist of a water stream applied at random to all exposed surfaces of the test specimens through a 38-mm (1½ in) fog nozzle set at a discharge angle of 15 degrees with a nozzle pressure of 517 kPa (75 psi) at a minimum discharge rate of 284 lpm (75 gpm) with the tip of the nozzle at a

maximum distance of 3 m (10 ft) from the test specimen. The hose stream application will be continued for at least 5 minutes upon completion of the test.

A visual inspection of all test articles will be conducted following the hose stream test. The purpose of the inspection will be to ascertain whether the ERFBS remained intact during the fire exposure and the cooling and mechanical impact of the hose stream test without developing any openings or breaches. Visible indications of an opening will include obvious tears or displacement of a barrier section or a view of the covered raceway through the fire barrier.

Photographs and video of the test specimens, both prior to and after disassembly, will be taken during the post-test inspection and recorded as part of the test documentation.

3.6 Instrumentation and Data Collection

The primary data to be generated in these tests will be component temperatures as indicated by insulated 24-gage Type-K thermocouples (Special Limit 32 to 2282°F range and 2°F or 0.4% tolerance value per ASTM E230-ANSI MC 96.1). The junction box temperatures will be monitored using Type-K thermocouples sheathed in Inconel. These thermocouples have been calibrated and certified to accuracies within 4°F of the comparison standard over a temperature range of 70°F to 1000°F. Test #1 will require the use of approximately 380 thermocouples to monitor the test specimen temperatures. Test #2 will require about 335 thermocouples. Approximately 400 thermocouples will be needed for Test #3. The outputs of the thermocouples will be sent to a computerized data collection unit for recording and storage. Each thermocouple's output will be recorded at least once per minute. It is expected that Teflon-coated thermocouples will be used during Test #3 to ensure that there will not be interference from any gases evolving from the M.T. ERFBS.

Figures A10 through A18 in Appendix A show the preferred attachment locations of the thermocouples on the test specimens. Routing the thermocouples for monitoring the tray temperatures will be by laying the bundles in the tray at the entry point and branching the

thermocouples off for mechanical attachment to the tray rails and bare copper conductor at the appropriate locations (See figures A13 and A14 in Appendix A). Similarly, for the cable drop thermocouples, the thermocouples will be bundled with the cable drop cables at the points of entrance and exit at the ceiling of the furnace and branching off the thermocouples for attachment to the bare copper conductor wire at 150-mm (6 in) spacing intervals (See figure A18 in Appendix A).

Each conduit will have thermocouples mechanically fastened to the side or bottom surface located along the outside perimeter of the “U” shape (See Figures A10, A11, and A12, in Appendix A). The routing of thermocouples for monitoring the temperature of the conduit will require that a series of small thermocouple bundles be placed around the circumference of the conduit and run to their individual attachment locations between the conduit and ERFBS. In order to minimize the effect of these small bundles on the test results, the conduit thermocouples will be run in underneath the ERFBS from both ends of the test specimen. The bare copper wire routed through the interior of each conduit test specimen will be instrumented with thermocouples installed with a maximum spacing of 150-mm (6 in) along its length. The junction boxes and condolet fittings will have at least one thermocouple attached to each side located at or as closely as possible to the geometric center of the side walls.

Note that the thermocouple locations indicated in these figures are for information purposes only. The thermocouples will be installed, except as noted, at 150-mm (6 in) intervals along the conduits, cable tray rails, and bare #8 copper wires in accordance with the guidance provided in Supplement 1 to Generic Letter (GL) 86-10. The instrumented bare #8 copper wire will be embedded within the copper wire bundles of the “loaded” raceways to protect the thermocouples from physical damage when the bundles are pulled through the raceways. Thermocouples will be attached to the raceway vertical legs located 25-mm (1 in) above the top of the test deck and 25-mm (1 in) below the exposed surface of the insulation on the bottom of the test deck.

3.7 Follow-on Tests

The decision to plan and conduct follow-on tests will be made by NRC (RES) on the basis of the primary test results.

4 REPORTING AND DOCUMENTATION

For each test conducted, the testing laboratory shall produce a draft report within two weeks of completion of the test. Each draft report (including electronic data and color photographs) will be submitted to SNL for a one-week comment period. The draft report will contain a summary of the thermocouple data and a simple analysis on the effects of cable mass on ERFBS performance. Upon receipt of comments, the test laboratory shall issue the final test report within two weeks to SNL. The final report shall contain all thermocouple data (including plots and location maps), QA documentation and construction drawings and ERFBS installation details. Thermocouple data plots will include graphs of (1) each individual temperature monitored during the test, (2) graphs of the average and maximum temperatures recorded for each test specimen exterior surface as a function of time, and (3) graphs of the average and maximum temperatures recorded for each test specimen instrumented bare #8 conductor as a function of time. SNL shall review the final report for accuracy and transmit the complete laboratory report to NRC (RES) within one week.

The test data will be analyzed and the fire barrier performance will be evaluated based on the acceptance criteria.

It should be recognized that the possibility exists that these test results may form the technical basis for broad acceptance of these fire protection systems by NRC, or provided the basis for enforcement action or backfit requirements, as deemed appropriate.

5 REFERENCES

10 CFR, Part 50, Appendix R, Fire Protection Program for Operating Nuclear Power Plants.

Supplement 1 to Generic Letter 86-10, Fire Endurance Test Acceptance Criteria for Fire Barrier Systems used to Separate Redundant Safe Shutdown Trains within the Same Fire Area, March 25, 1994.

ASTM E 119 – 00a, Standard Test Methods for Fire Tests of Building Construction and Materials.

A Test Specimen Configuration Details and Thermocouple Location Plan

These diagrams are not to scale and indicate test specimens assembly and thermocouple installation details for illustrative purposes only.

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

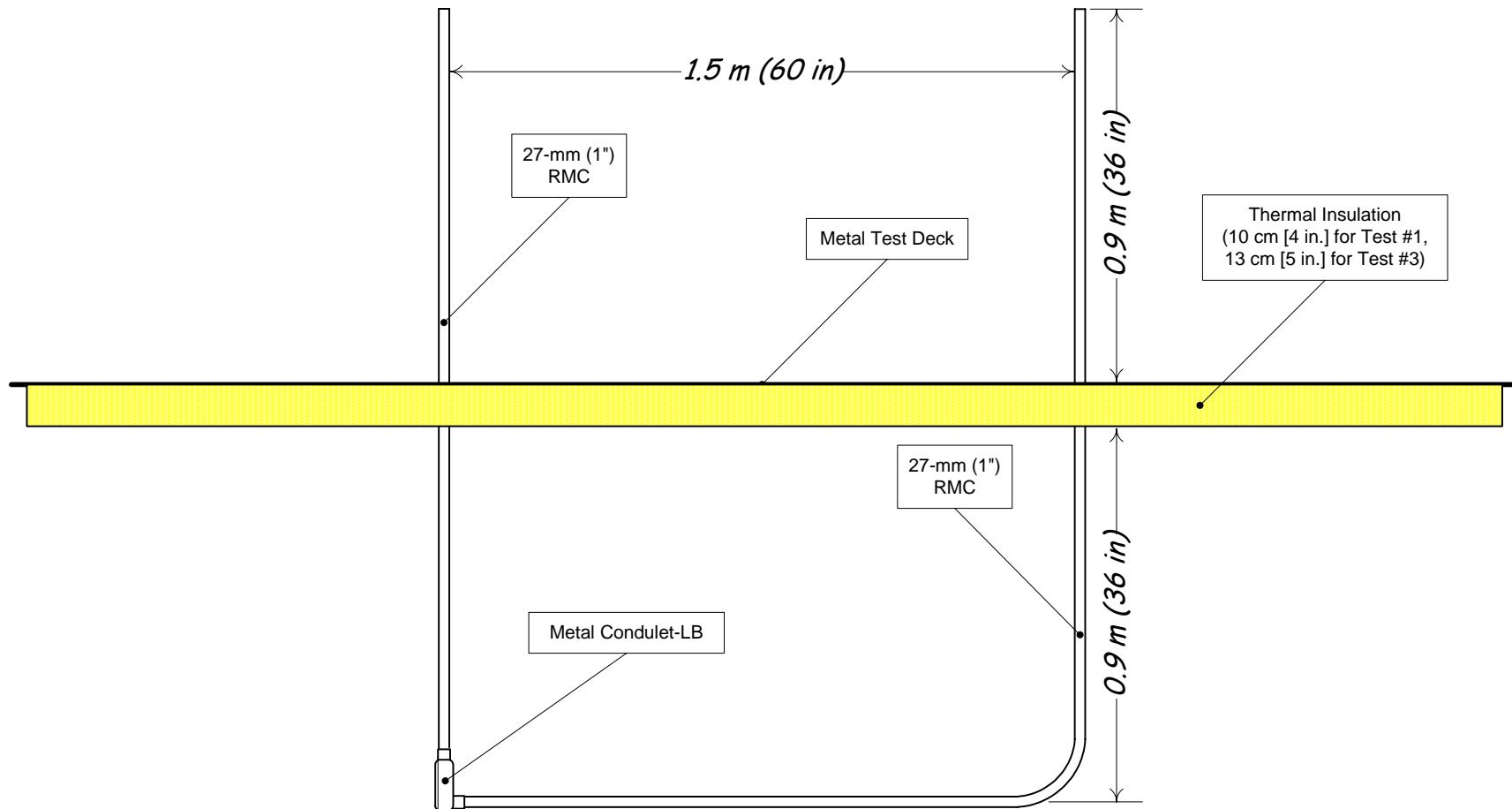


Figure A1: 27-mm (1-in) rigid metal conduit test specimens (side view with dimensions).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

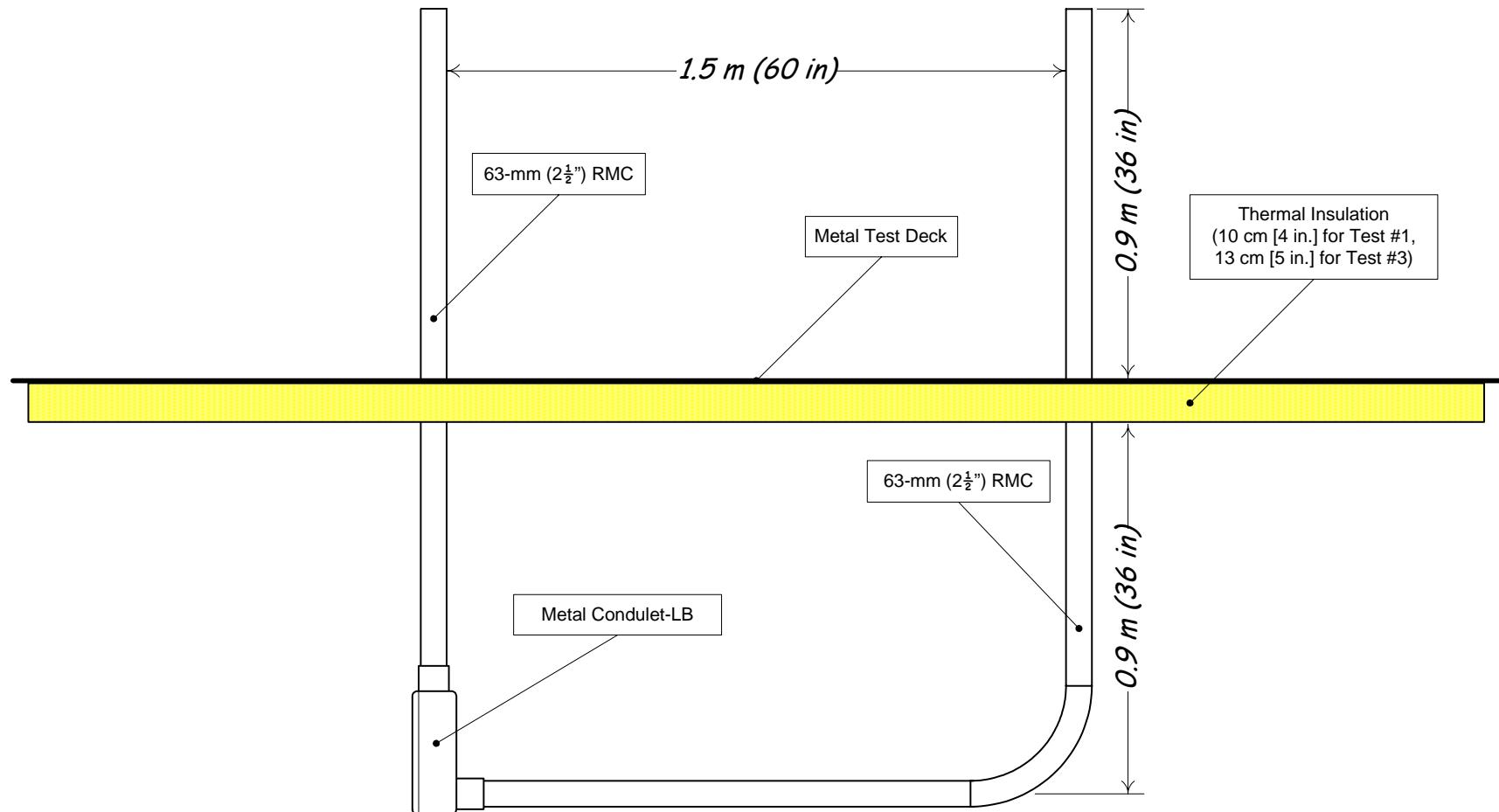


Figure A2: 63-mm (2 1/2-in) rigid metal conduit test specimens (side view with dimensions).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

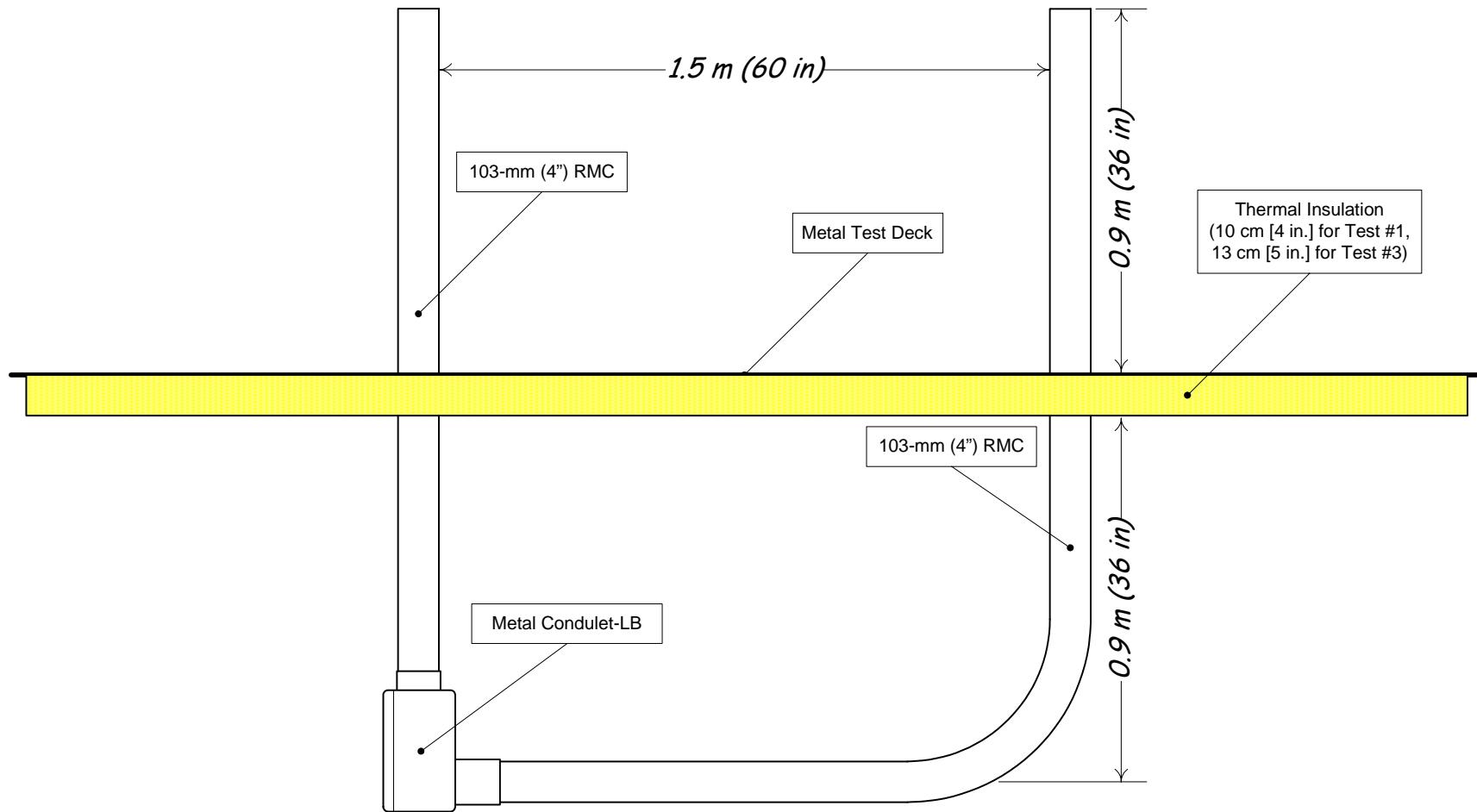


Figure A3: 103-mm (4-in) rigid metal conduit test specimens (side view with dimensions).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

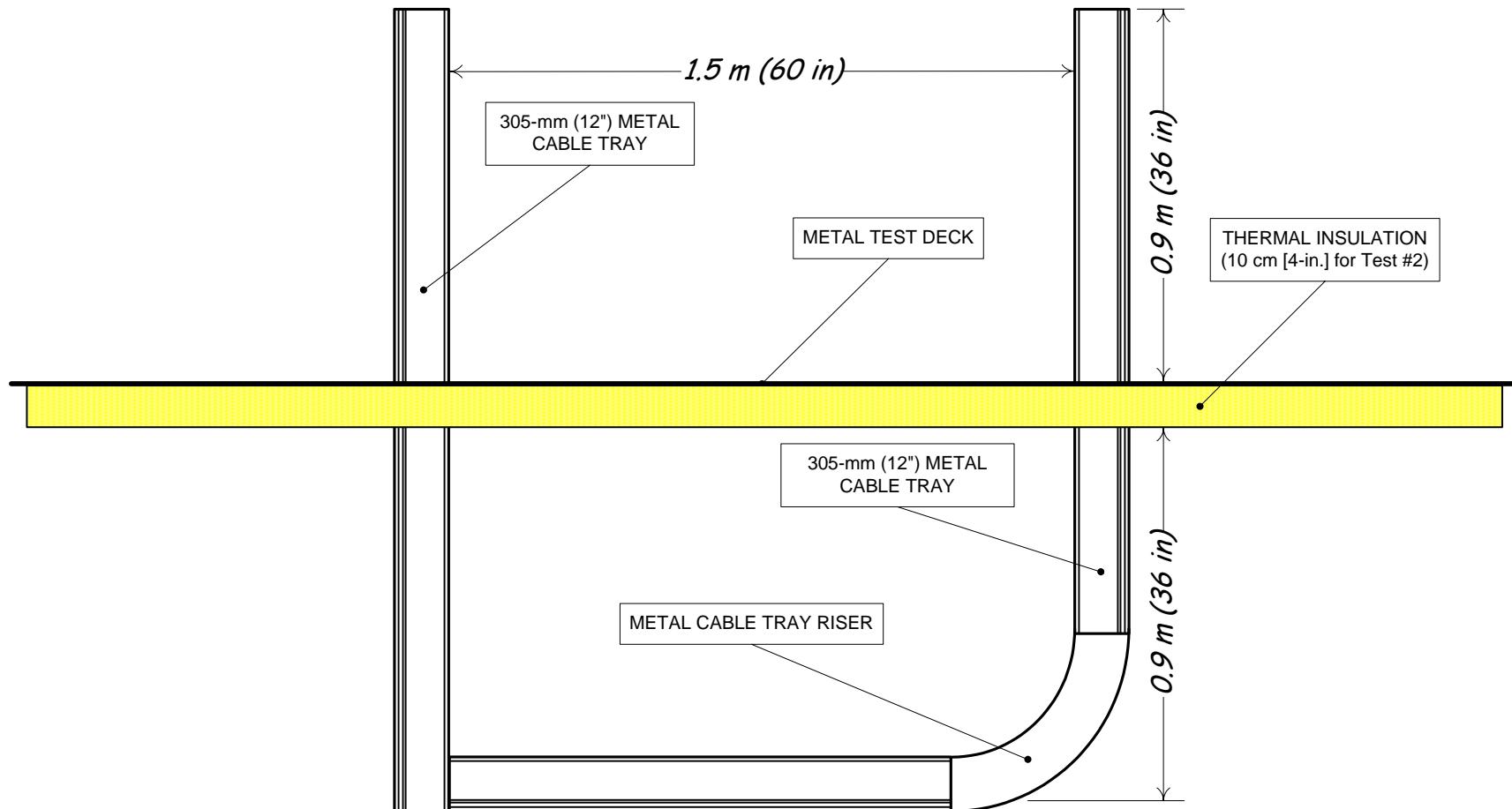


Figure A4: 305-mm (12-in) cable tray test specimens (side view with dimensions). Cable trays will be ladder type, 18-gage galvanized steel with 10 cm (4 in) high side rails and 23 cm (9 in) rung spacing.

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

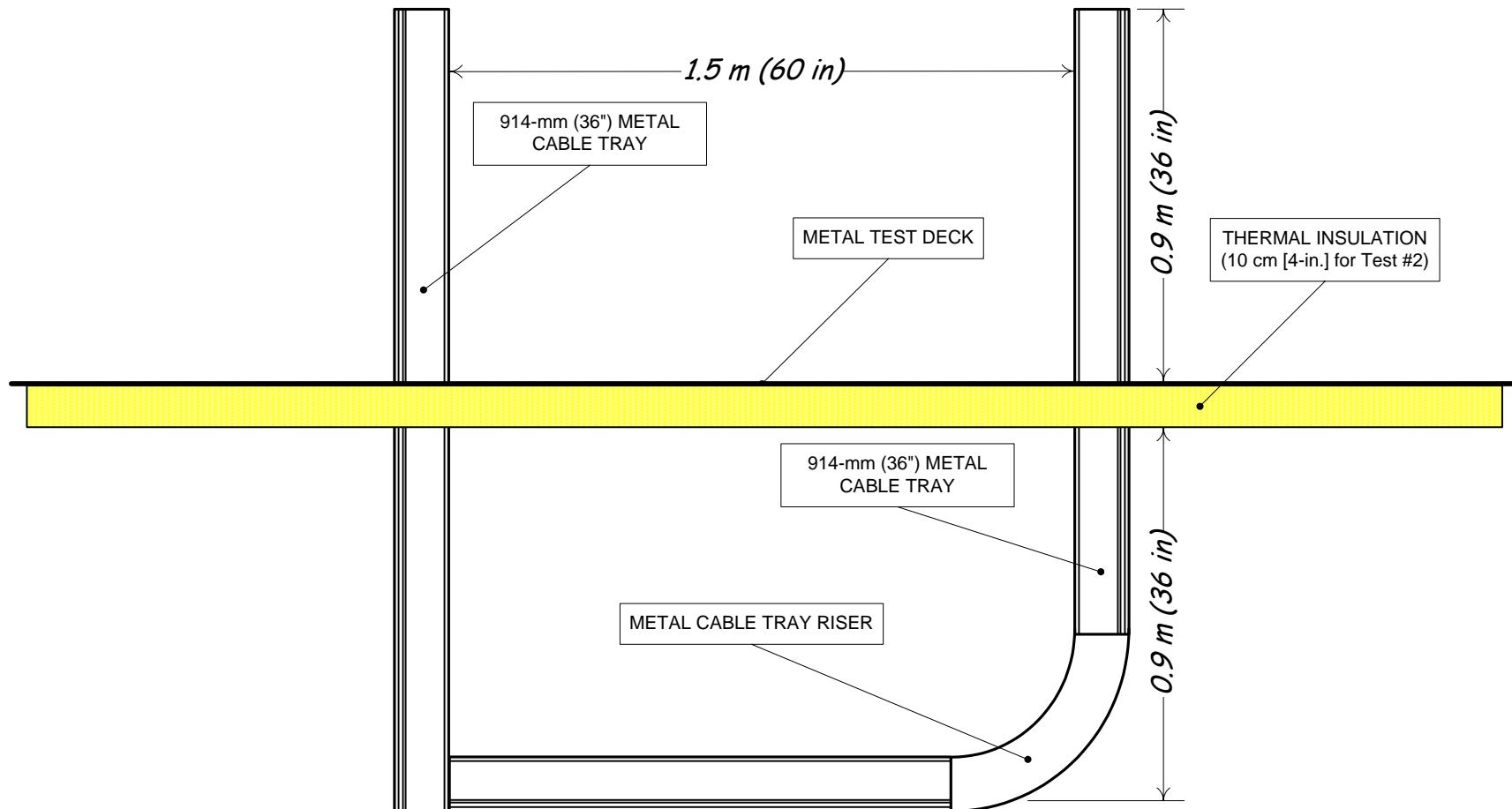


Figure A5: 914-mm (36-in) cable tray test specimens (side view with dimensions). Cable trays will be ladder type, 18-gage galvanized steel with 10 cm (4 in) high side rails and 23 cm (9 in) rung spacing.

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

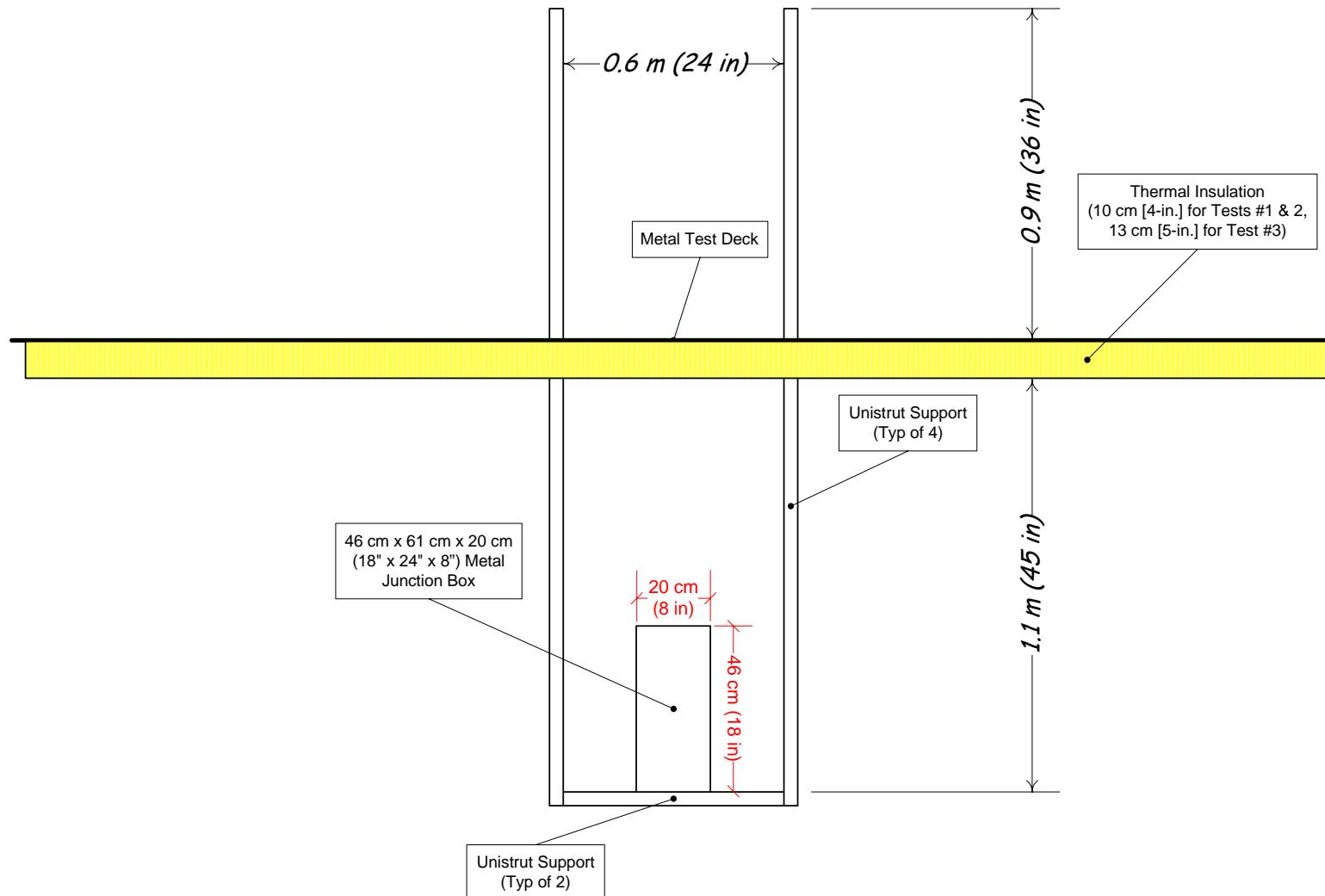


Figure A6 (a): Junction box test specimens (front elevation view with dimensions).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

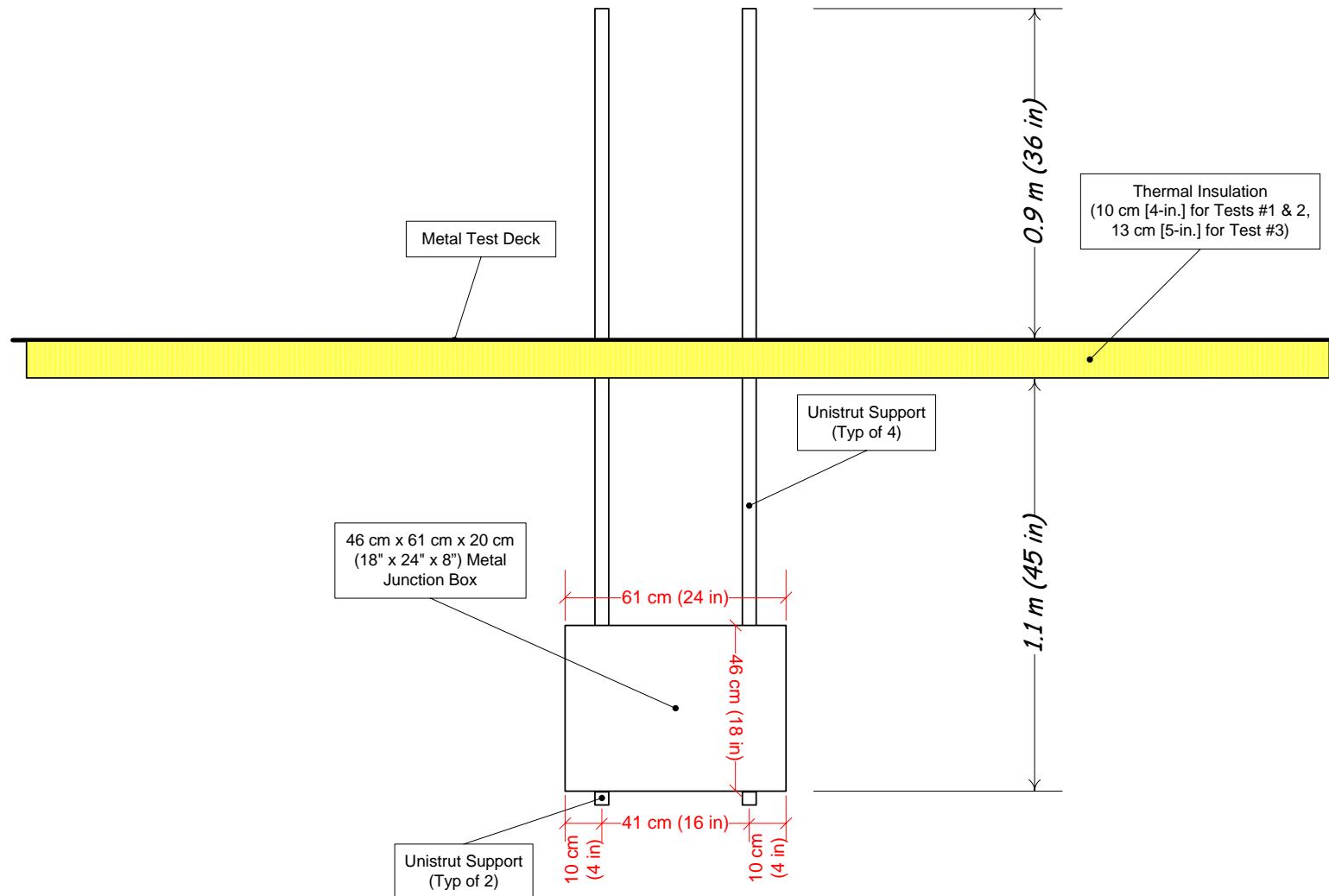


Figure A6 (b): Junction box test specimens (side elevation view with dimensions).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

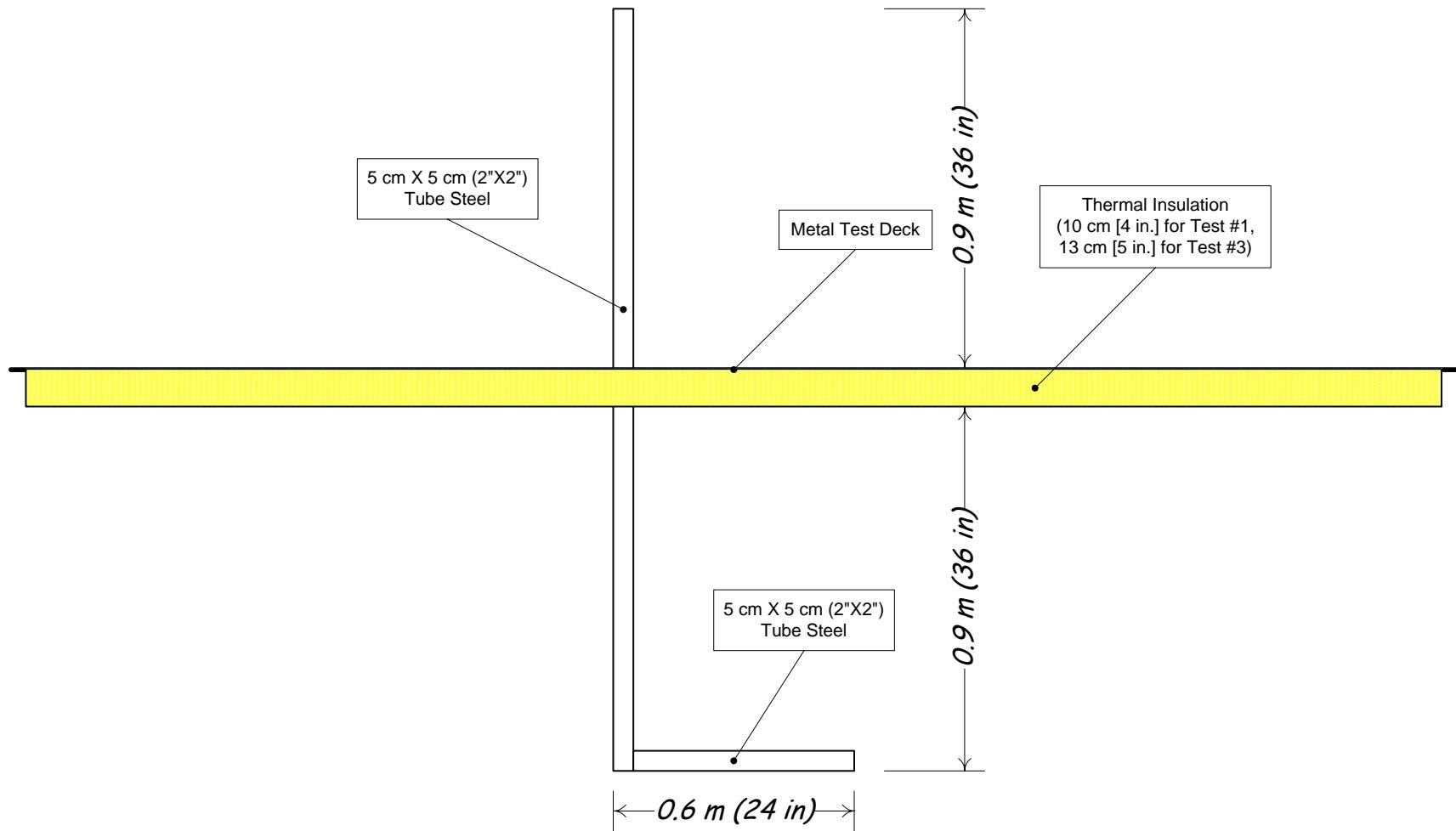


Figure A7: Tube steel support structure test specimens (side view with dimensions).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

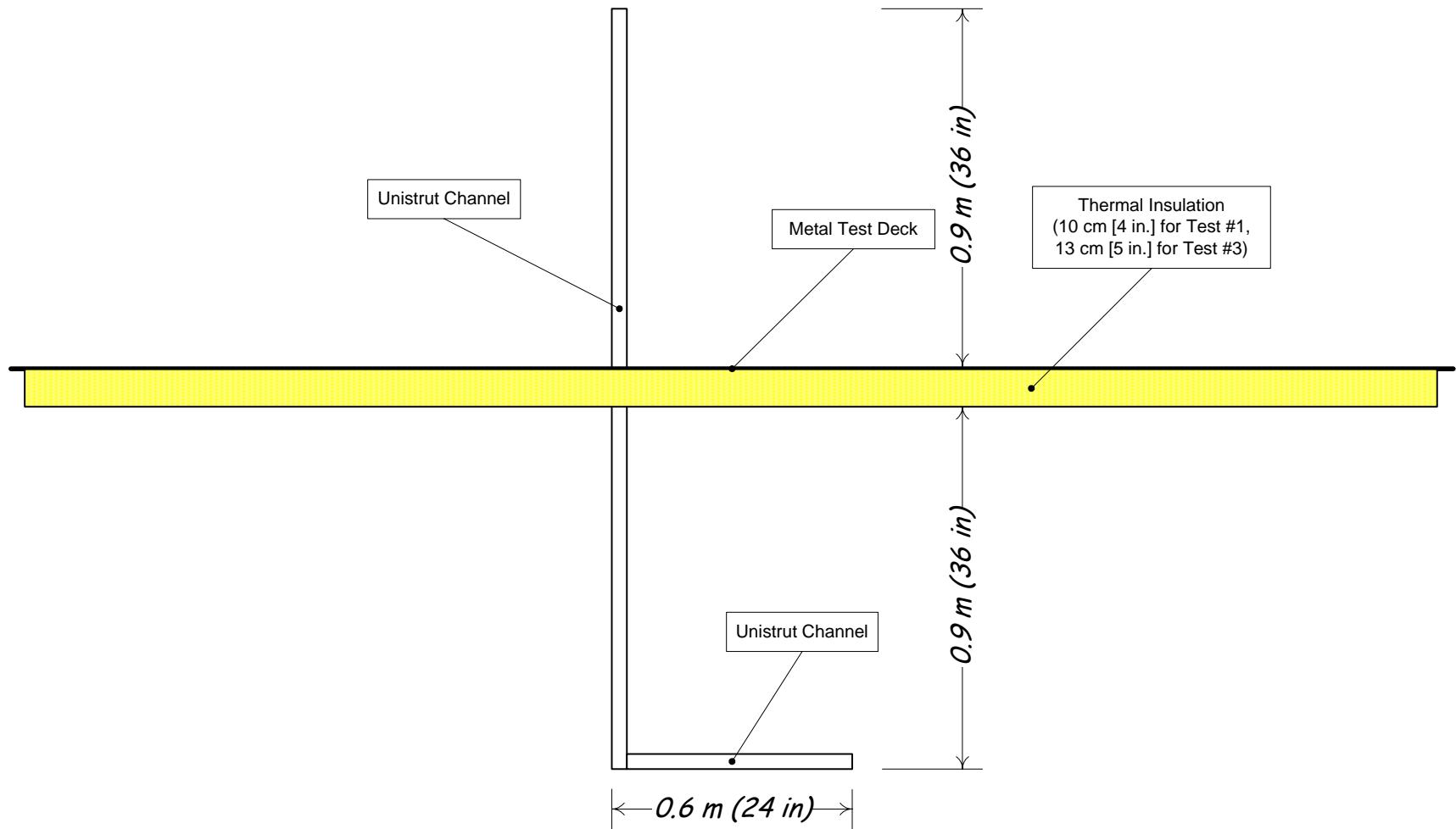


Figure A8: Unistrut® support structure test specimens (side view with dimensions).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

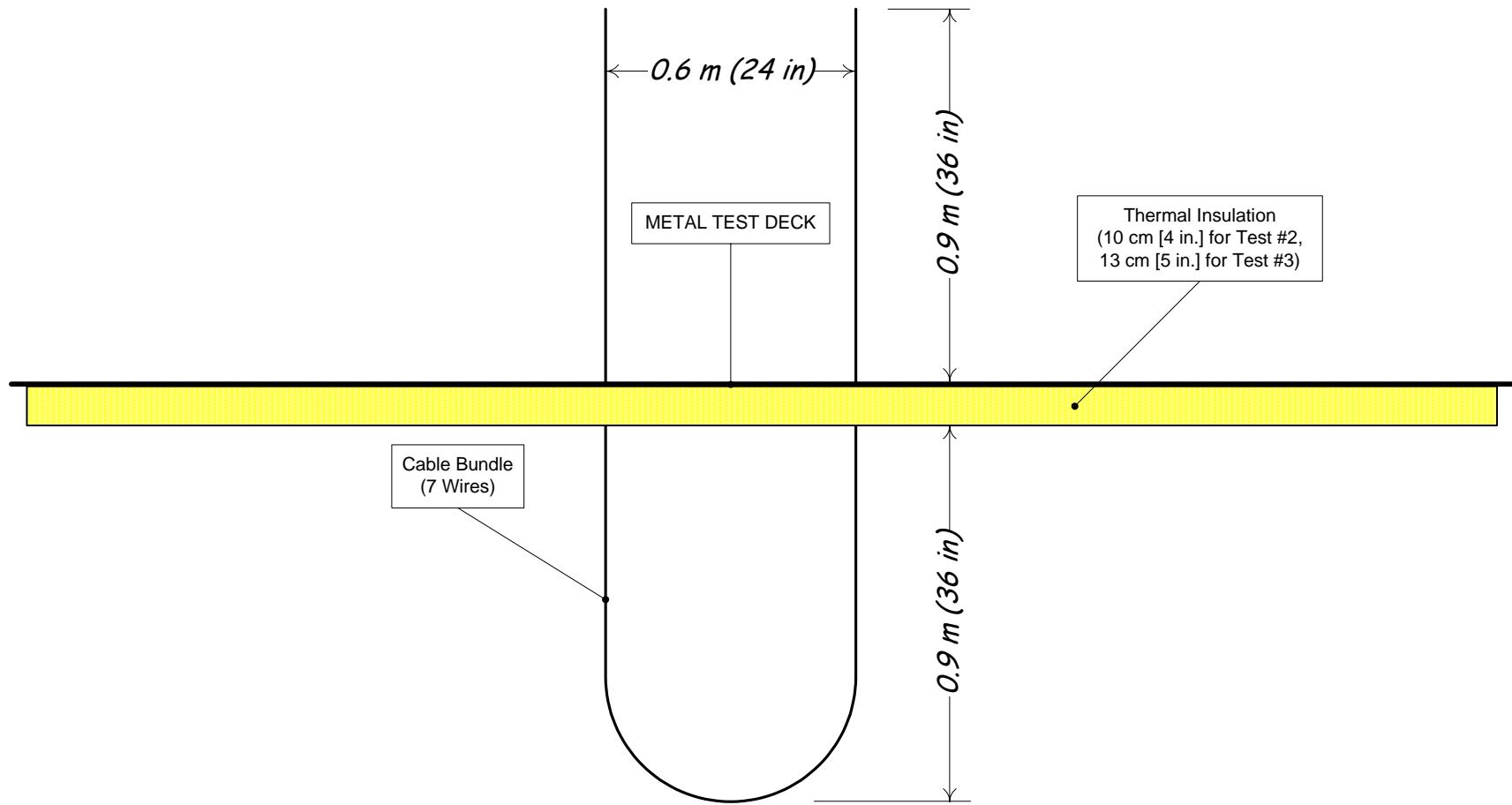


Figure A9: Unsupported cable-drop test specimens (side view with dimensions).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

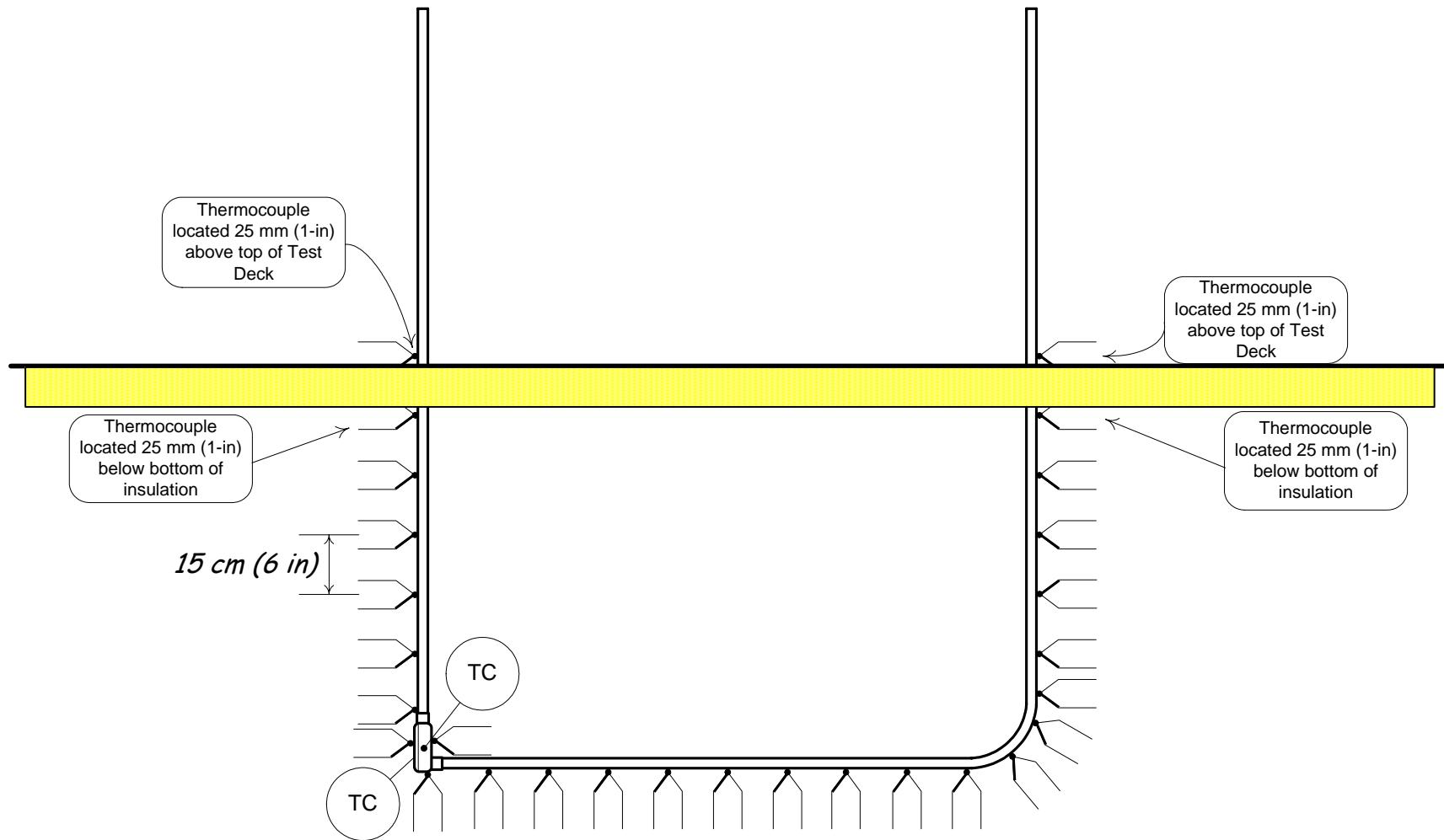


Figure A10: Thermocouple placement on 27-mm (1-in) conduit test specimens (additional thermocouples to be attached—at 150-mm [6-in] spacing intervals—to a bare #8 copper wire routed through conduit).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

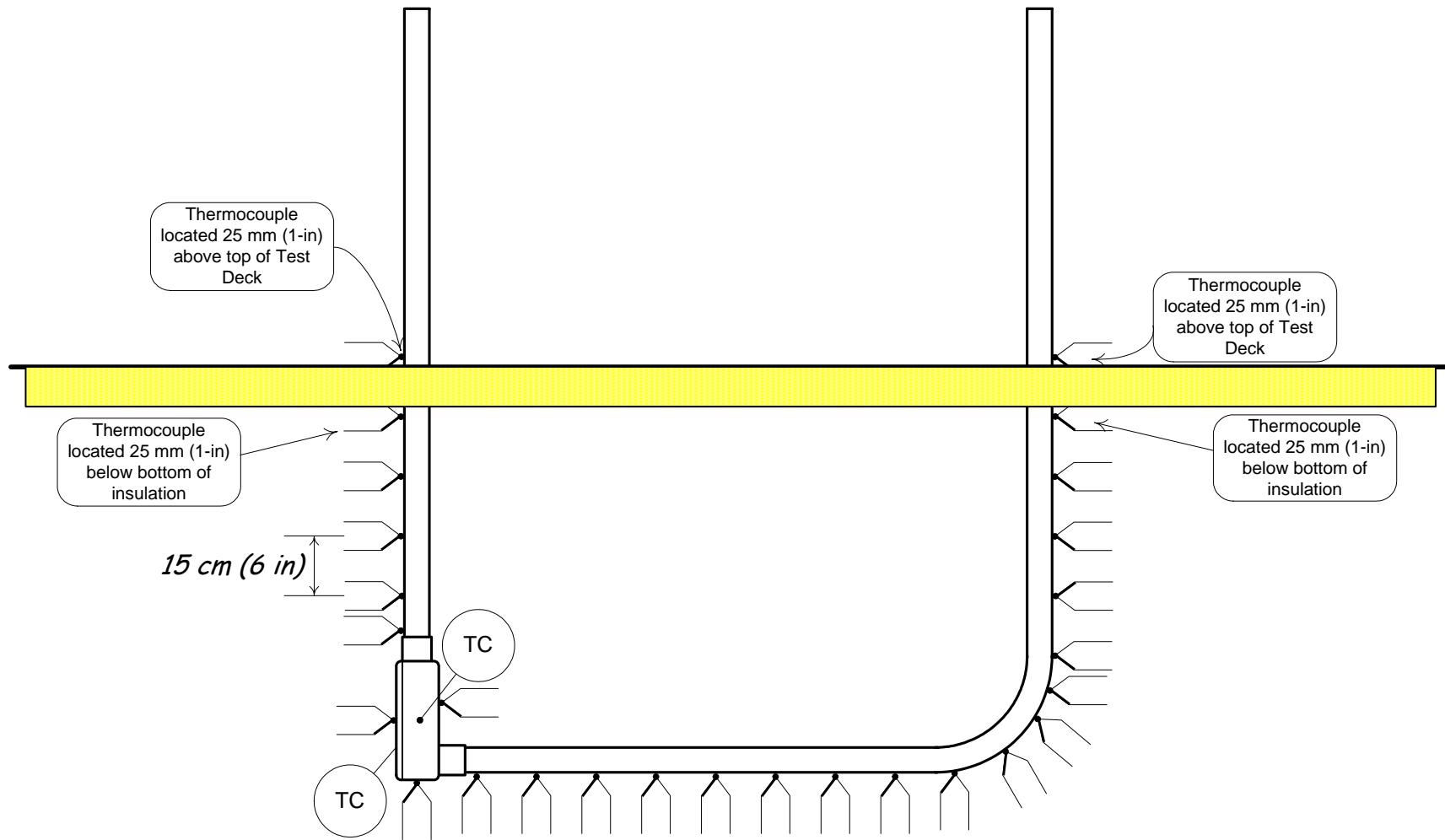


Figure A11: Thermocouple placement on 63-mm (2½-in) conduit test specimens (additional thermocouples to be attached—at 150-mm [6-in] spacing intervals—to a bare #8 copper wire routed through conduit).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

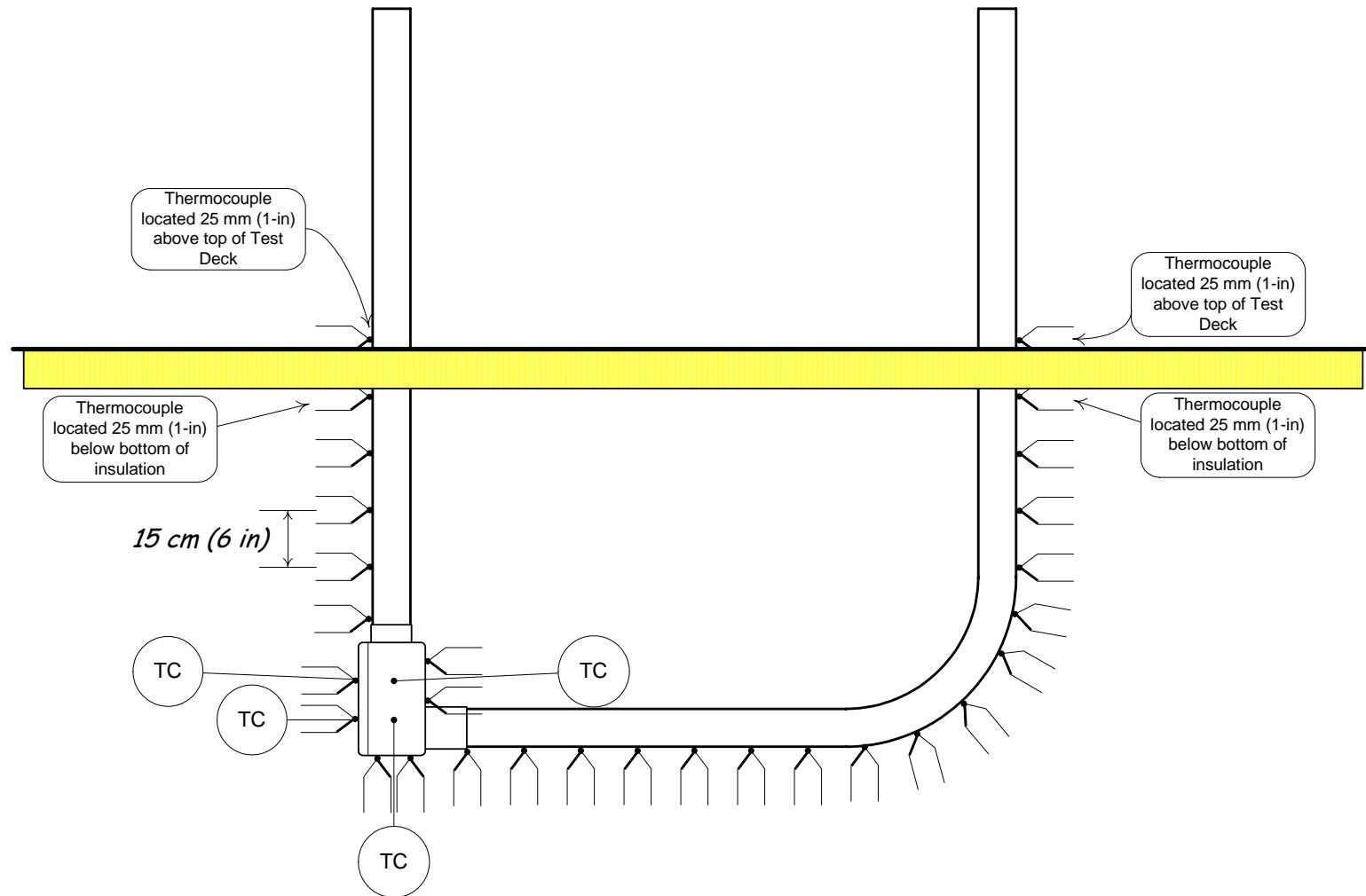


Figure A12: Thermocouple placement on 103-mm (4-in) conduit test specimens (additional thermocouples to be attached—at 150-mm [6-in] spacing intervals—to a bare #8 copper wire routed through conduit).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

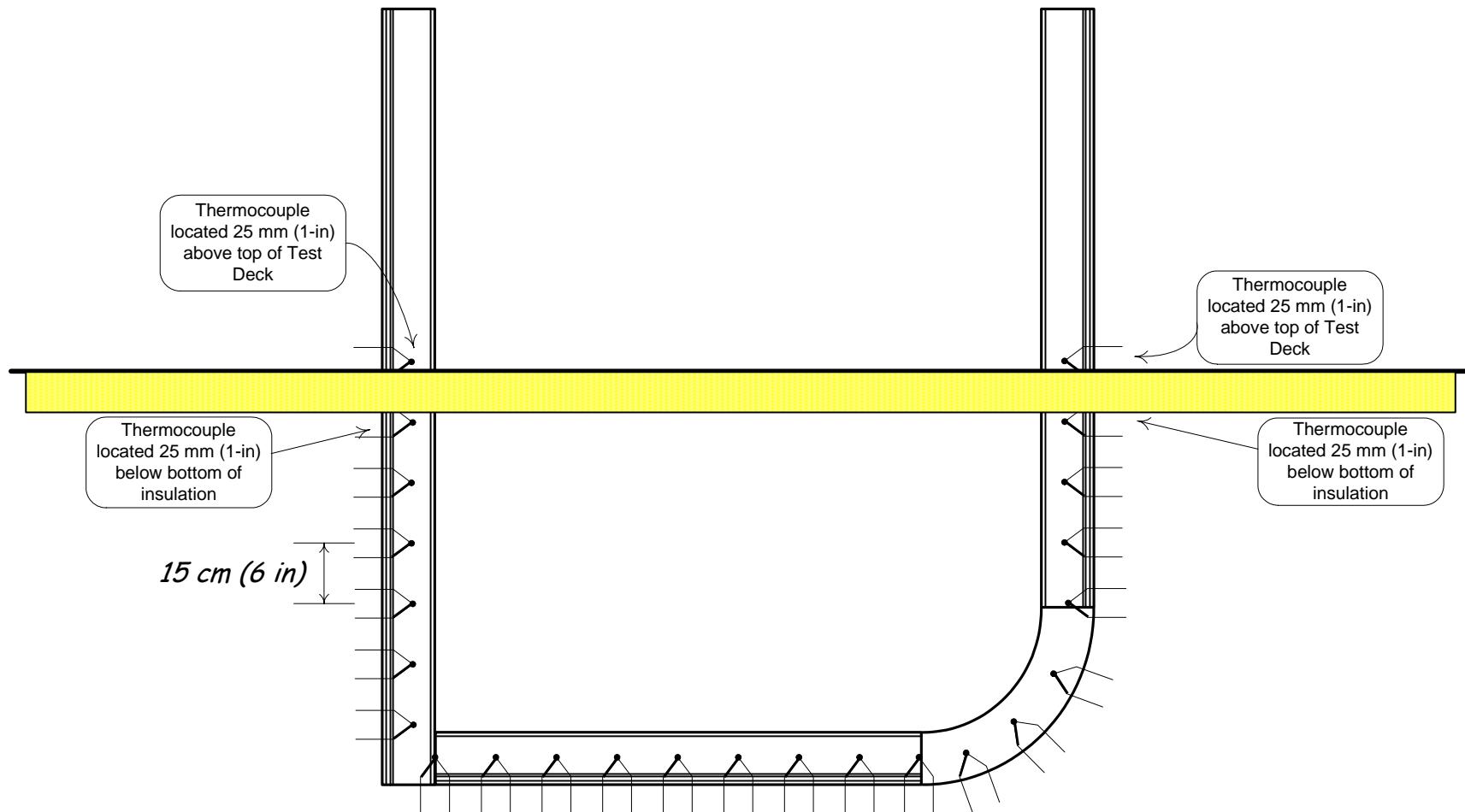


Figure A13: Thermocouple placement on 305-mm (12-in) cable tray test specimens (side view only, additional thermocouples to be attached at 150-mm [6-in] spacing intervals on other side rail and to a bare #8 copper wire routed along the mid-axis of the tray on the bottom of the rungs).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

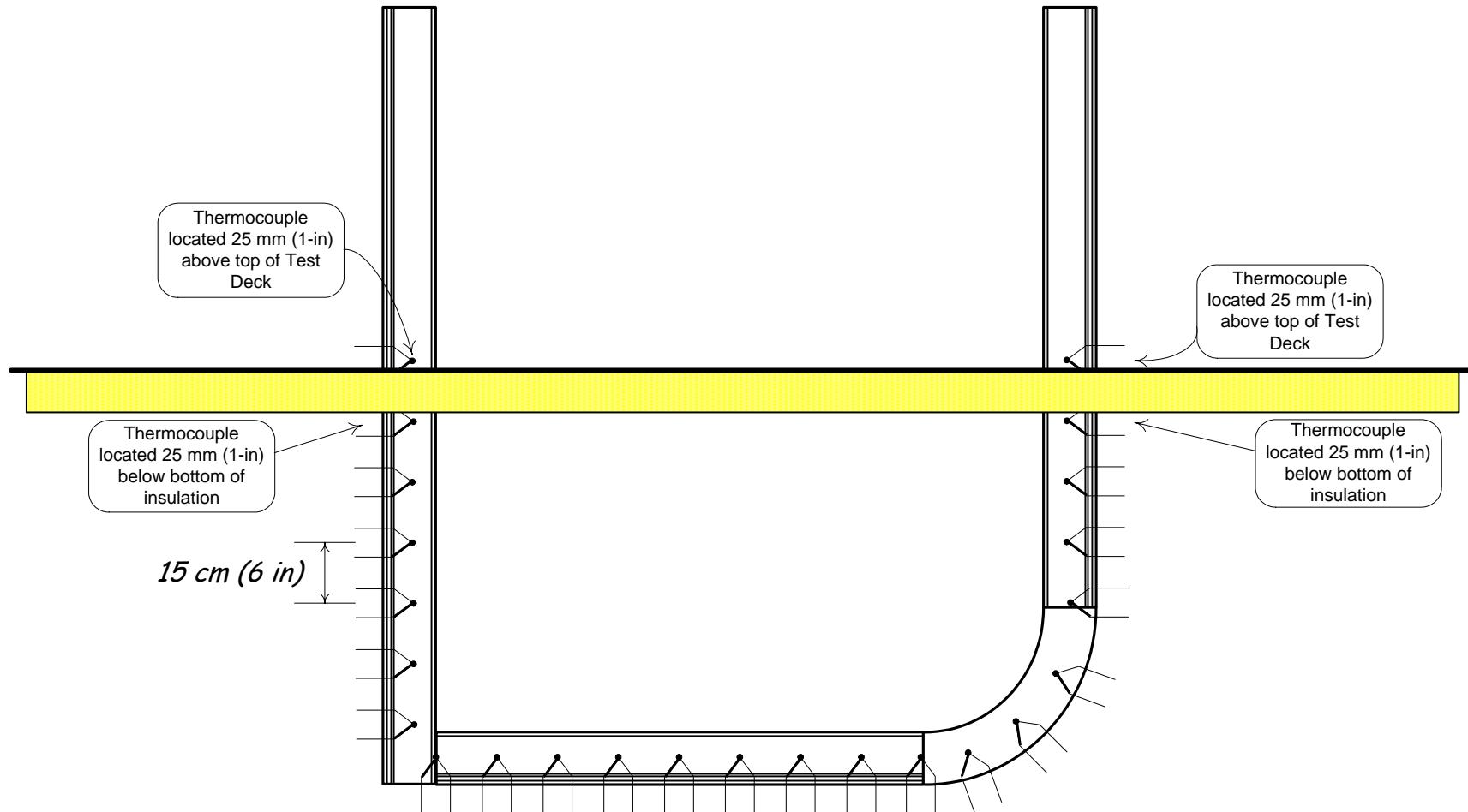


Figure A14: Thermocouple placement on 914-mm (36-in) cable tray test specimens (side view only, additional thermocouples to be attached at 150-mm [6-in] spacing intervals on other side rail and to a bare #8 copper wire routed along the mid-axis of the tray on the bottom of the rungs).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

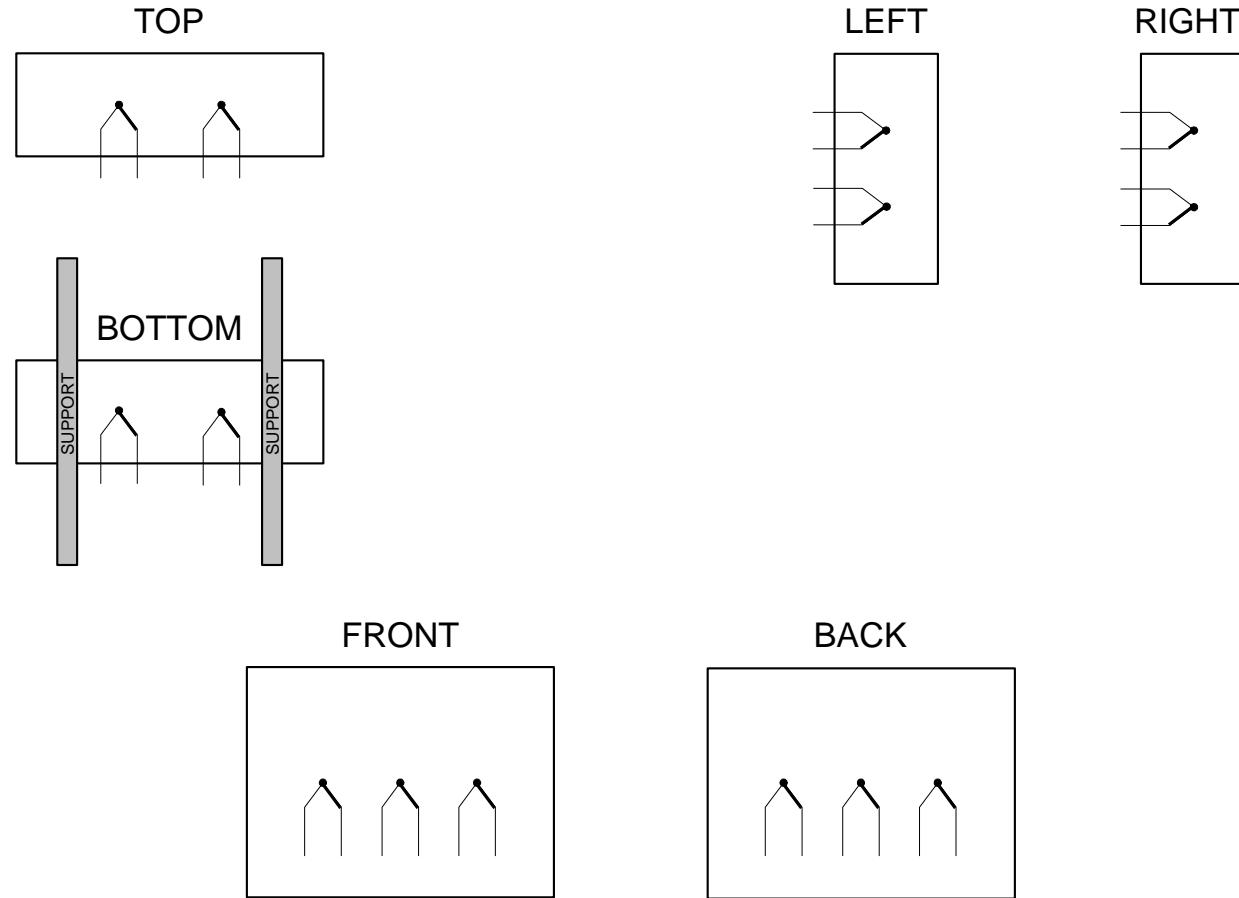


Figure A15: Thermocouple placement on junction box test specimen surfaces (no bare #8 copper conductor wire will be located inside the box and no thermocouples will be used to monitor the status of the junction box supports).

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

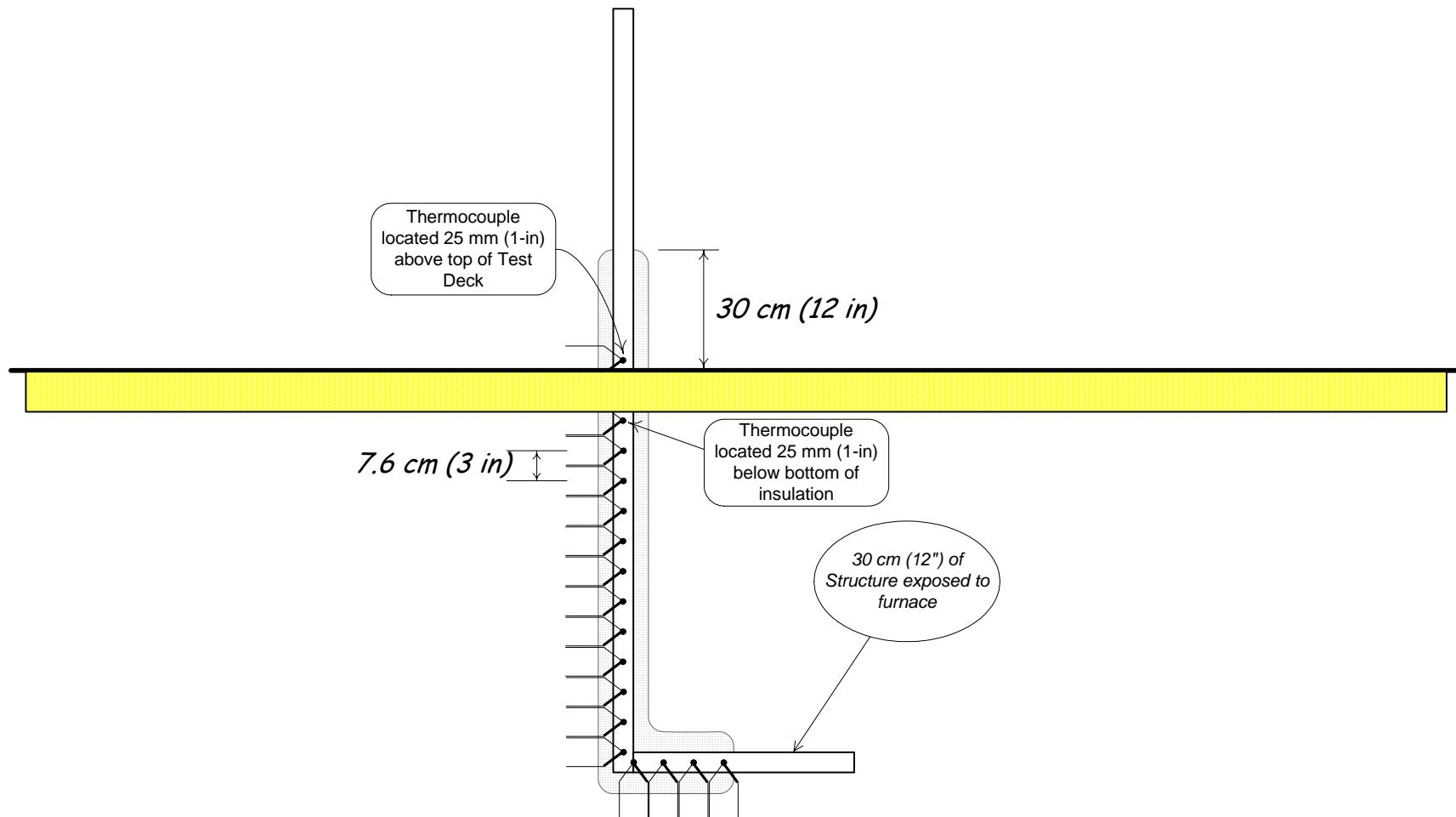


Figure A16: Thermocouple placement on tube steel support structure test specimens. (Note: ERFBS silhouette shown for reference only.)

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

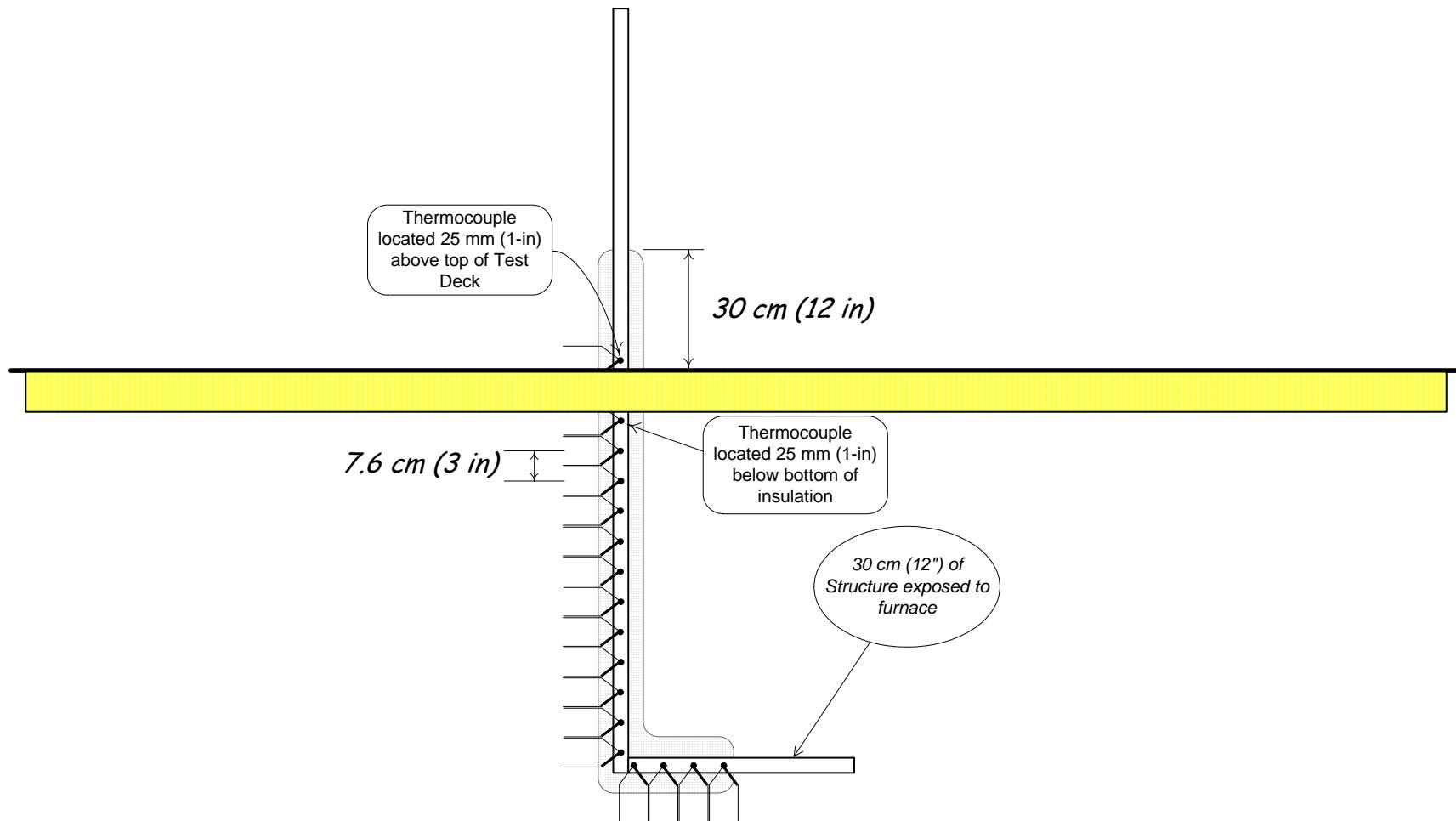


Figure A17: Thermocouple placement on Unistrut® channel support structure test specimens. (Note: ERFBS silhouette shown for reference only.)

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

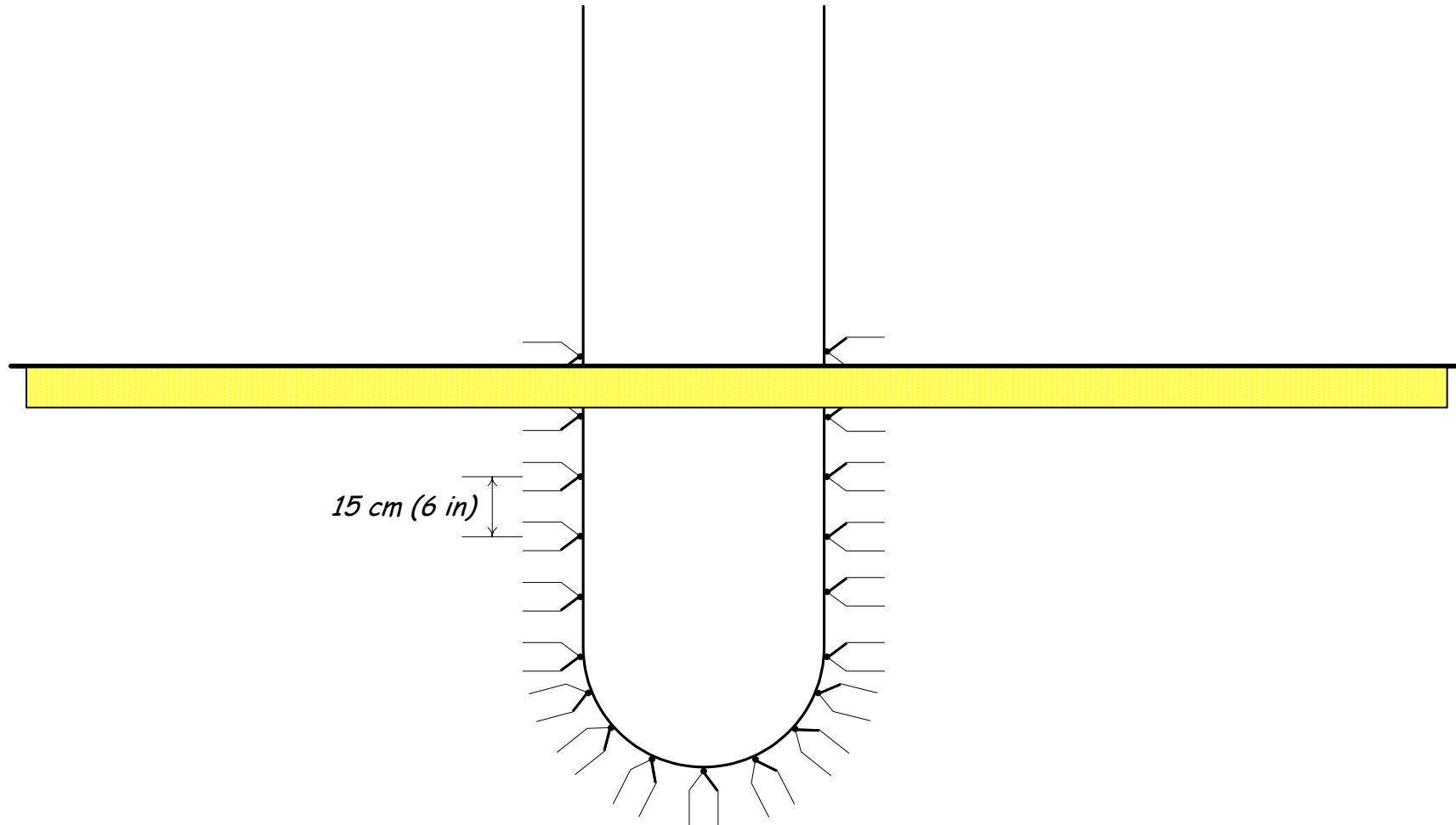


Figure A18: Thermocouple placement on unsupported cable drop test specimens.

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

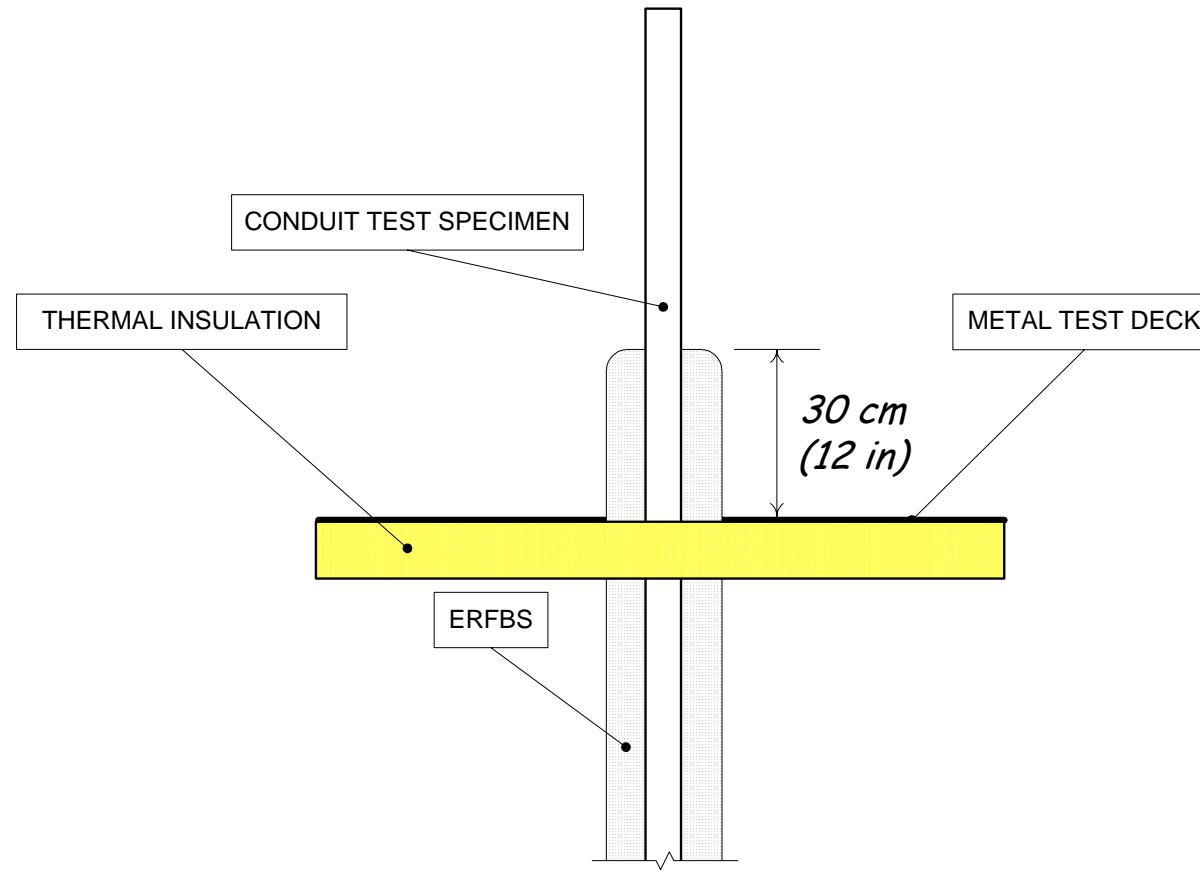


Figure A19: Detail of conduit test specimen direct attachment ERFBS extension through the test deck.

Appendix A: Test Specimen Configuration Details and Thermocouple Location Plan

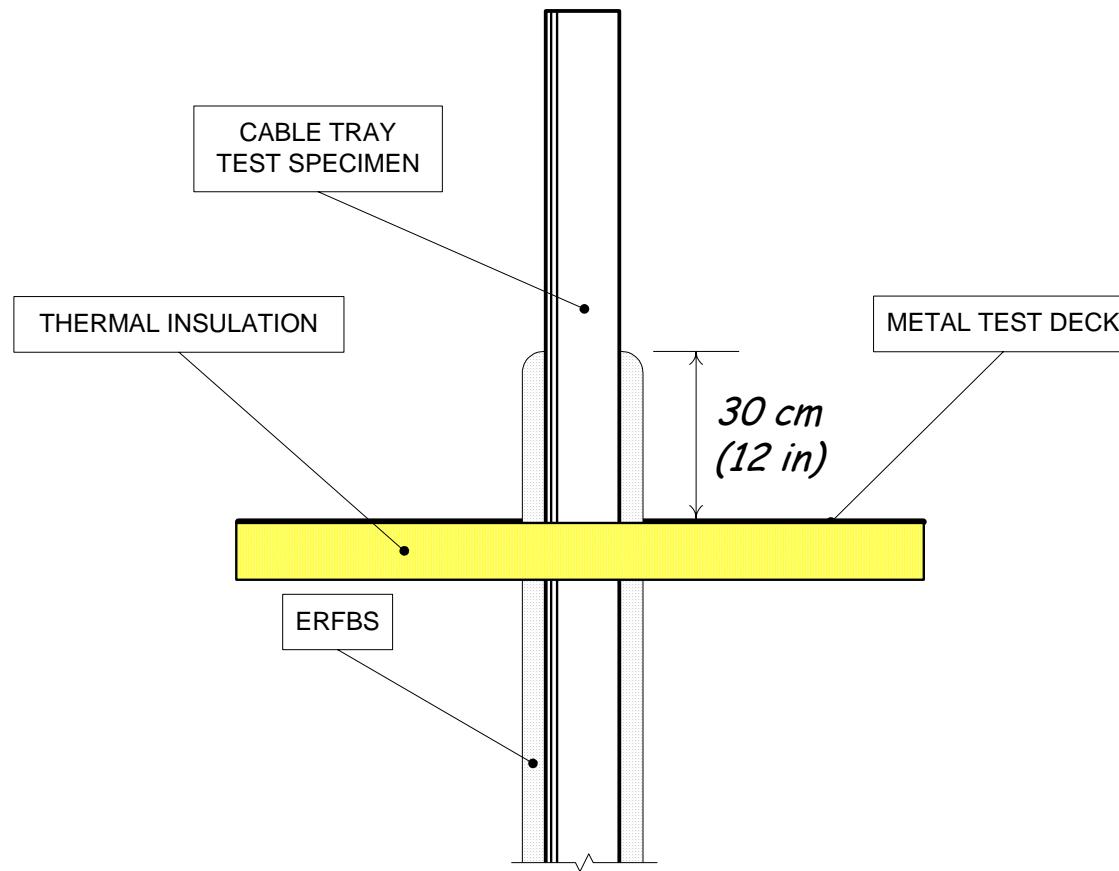


Figure A20: Detail of cable tray test specimen direct attachment ERFBS extension through the test deck.

B Email Correspondence from NEI to NRC Regarding Predominant Industry Practices for Hemyc

The message below is the body of an email from Fred Emerson, NEI, to Mark Salley, NRC, dated January 18, 2005, with subject heading, "Hemyc – Predominant Industry Practices."

Appendix B: Email Correspondence From NEI to NRC Regarding Predominant Industry Practices for Hemyc

Mark and Roy -

As requested, here are the answers to your questions.

Thanks,

Fred Emerson
202-739-8086

<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>

>>>>>>>>>>>

1. Fiberglass cloth inner cover. Which is the predominate industry practice ~ To use the fiberglass cloth on the non-fire side of the barrier, or to just use the siltemp material on both sides? Was there any difference between the conduit & cable trays (as to how it was done)

Answer: The predominant industry practice is to use siltemp for both the internal and external fabric. In some cases the fiberglass cloth was used on the internal side (facing the protected component) and in these cases the external fabric was overlapped a minimum of 6" onto the non-fire side.

2. Attachments The testing used finger straps. Most of the photos we have seen use banding. Which method was prevalent in industry? Again, any difference between conduit vs. cable tray vs. junction boxes (e.g., bands are prevalent on conduits, while finger straps were used on cable trays)

Answer: The predominant industry practice is to use stainless steel banding. This applies to cable trays, conduits and boxes.

3. Air drops What is predominate ~ the use of air gap spacers between the cable & fire barrier, or direct attachment around the air drop?

Answer: The predominant method is to install the Hemyc wrap with gap spacers to ensure that a "dead air space" is maintained between the unexposed side of the wrap and the protected cable surface.

4. Density of material The spec calls out 6 - 8 lb density. Did any licensee have any QA requirements to measure this? Is there any record of what density of material the licensee installed?

Answer: The material was specified to be 6 to 8 lb density as manufactured by Johns-Manville, Babcock & Wilcox or wrap vendor approved equal. This material was then installed to the specified thickness. No site verification of density was required nor necessary as the material used (density range) was consistent to that specified in the fire qualification tests. These materials were considered approved off-the-shelf items and required a certificate of compliance/conformance.

5. Joint Technique There are a number of different joint techniques, from butt joints, to overlapping the joint a minimum of 2 inches, to but joints with a 6 in. collar. Which method is predominate on conduits?
cable trays?

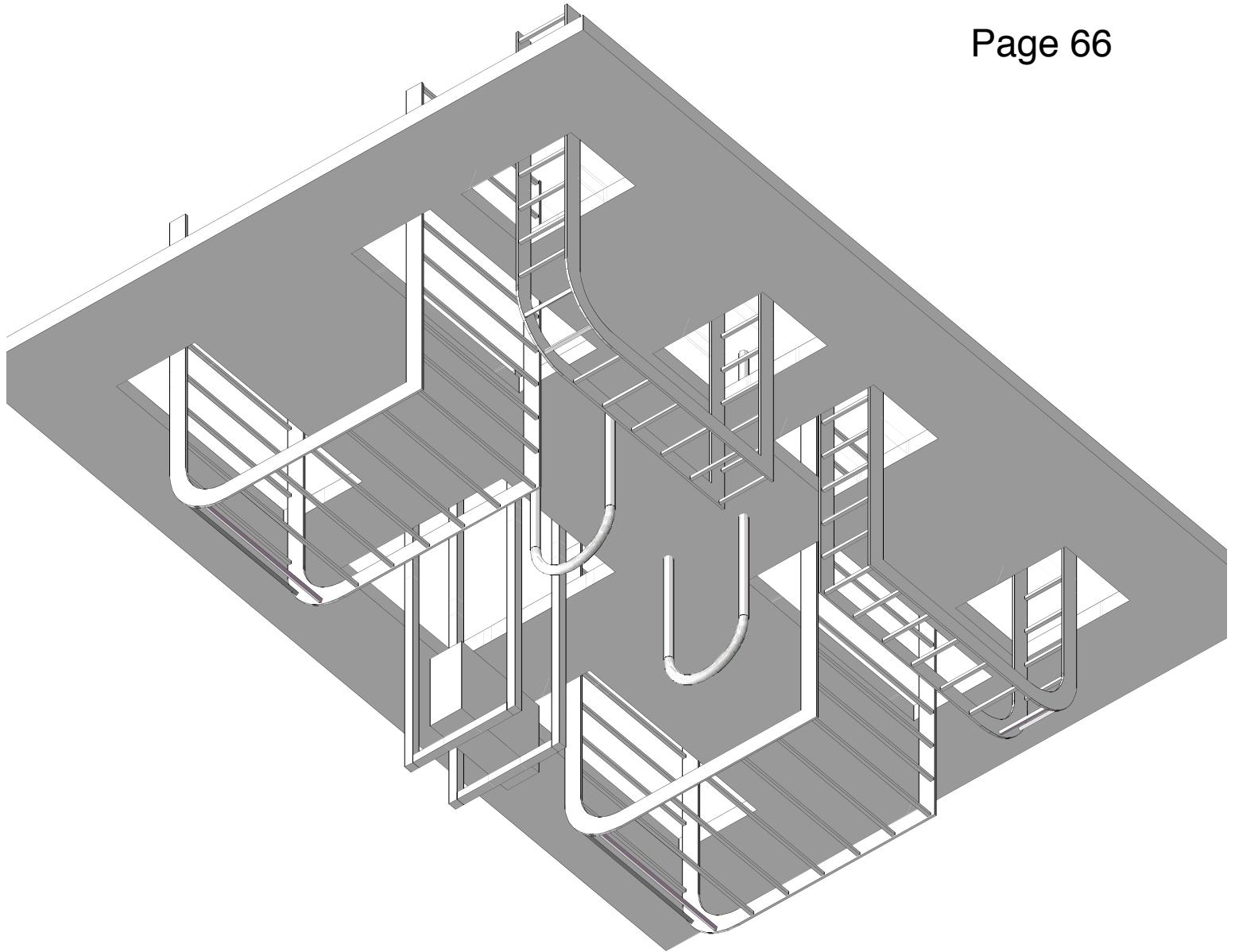
Appendix B: Email Correspondence From NEI to NRC Regarding Predominant Industry Practices for Hemyc

Answer: The industry is essentially evenly split between using an overlapping joint method and the butt joint with a collar method for conduits. Typically trays use the overlapping joint method with an overlapping joint of 2 inches.

Appendix B

CONSTRUCTION DRAWINGS





Note:

This view shows the separation and placement of all raceways in Test #2. Support members on the unexposed side of the deck are not shown.

OMEGA POINT LABORATORIES, INC.
Project No. 14790-123264

SANDIA NATIONAL LABORATORIES

Fig. 1, Rev. 1 Test 2 Assembly
Isometric View

Drwn by:D.N.Priest

OPL App'l: *C. Humphrey*

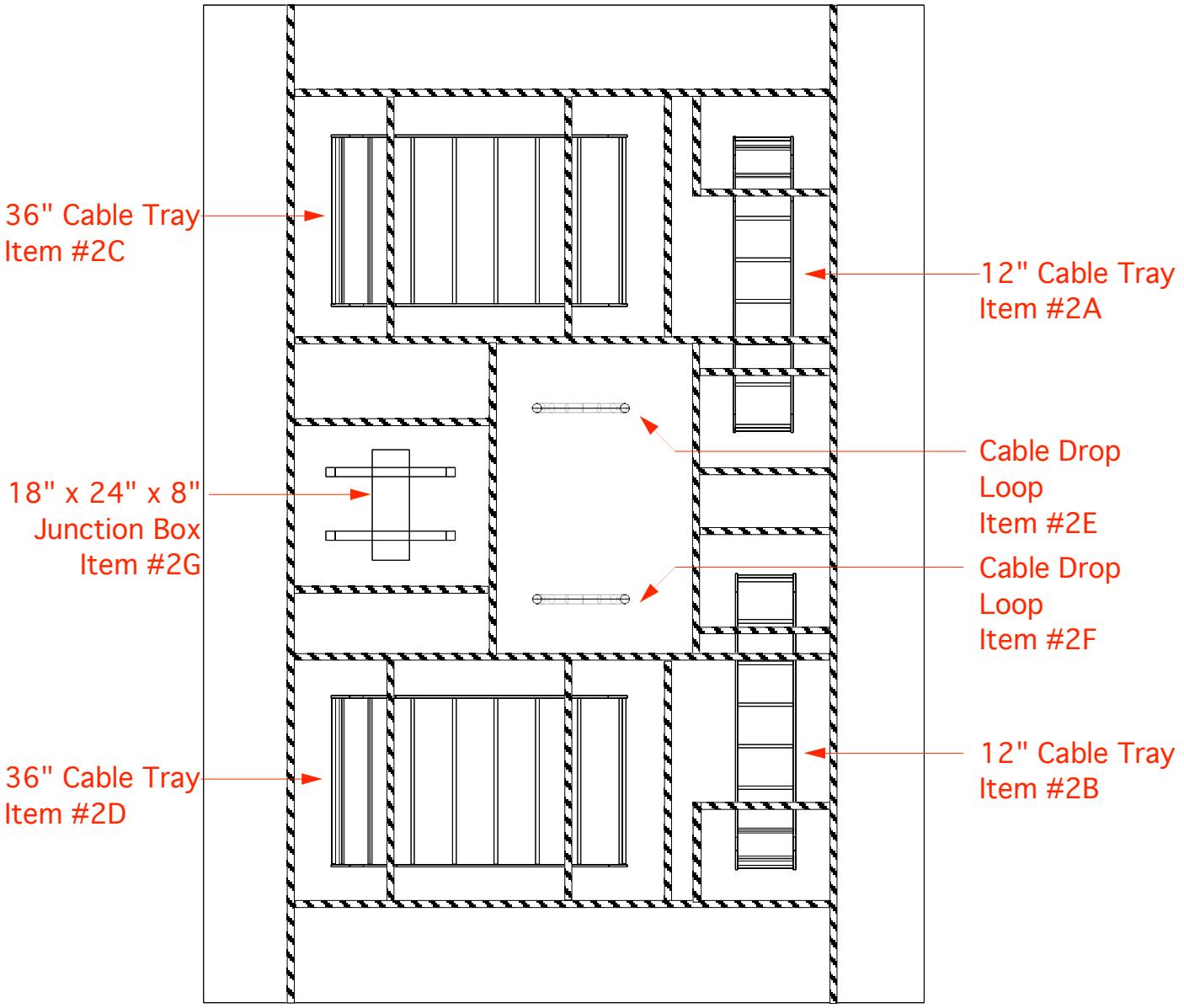
Sandia App'l:

Date: 1/4/05

Date: 1/4/05

Date:

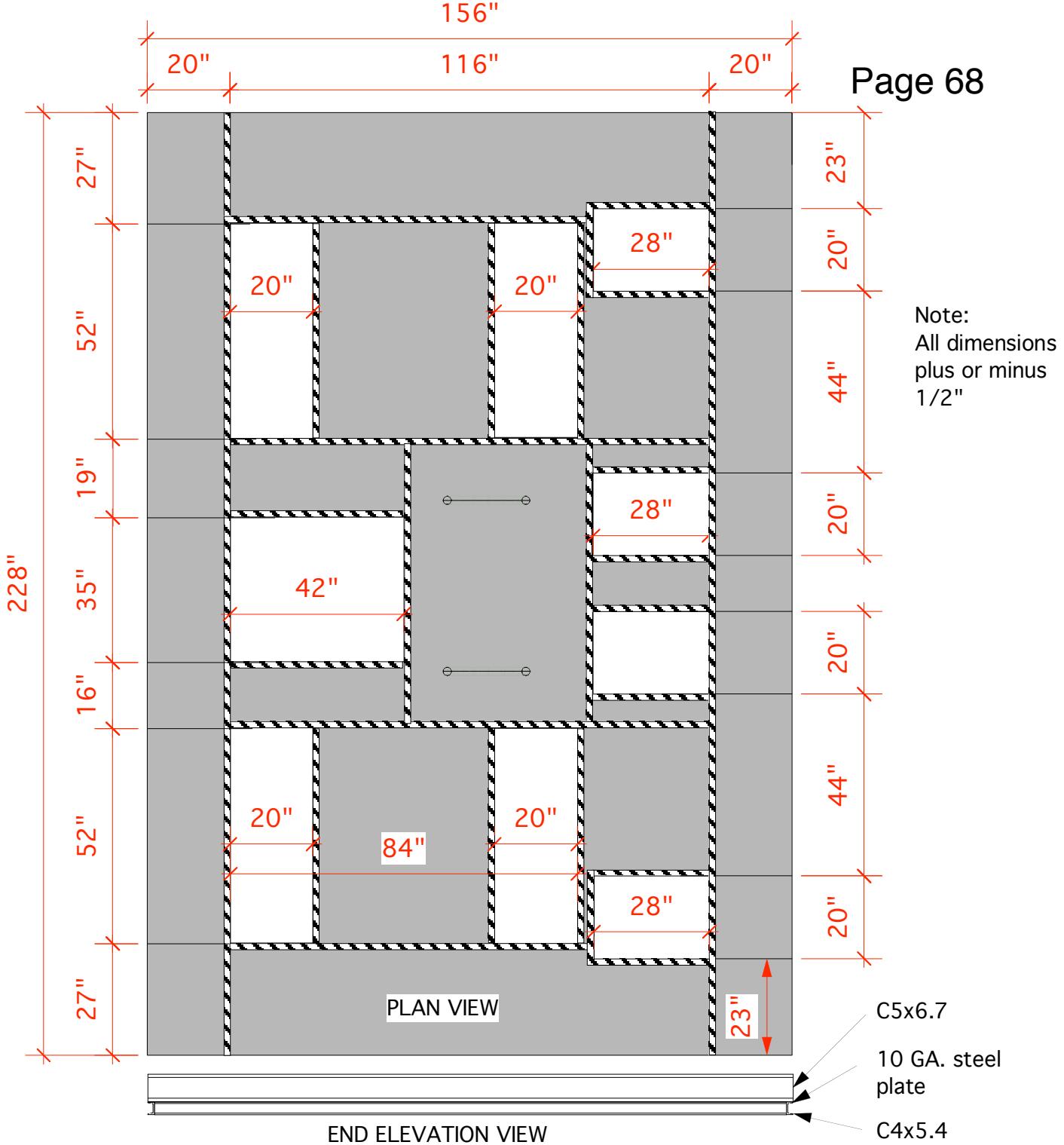
Scale=1:35

**Note:**

All raceway items have been placed in the furnace in symmetric locations, to give as uniform exposure as possible between two of the same items. In this drawing, the C5x6.7 structural channel above the deck steel is shown cross-hatched, and the deck steel and 4" channel below it are transparent, to indicate the placement of the raceways. See Fig. 3 Test 2 Assembly for deck and opening dimensions.

OMEGA POINT LABORATORIES, INC. Project No. 14790-123264	
SANDIA NATIONAL LABORATORIES	
Fig. 2, Rev. 2 Test 2 Assembly Raceway Layout	
Drwn by:D.N.Priest	Date: 1/25/05
OPL App'l: <i>C. Lumprey</i>	Date: 1/25/05
Sandia App'l:	Date:

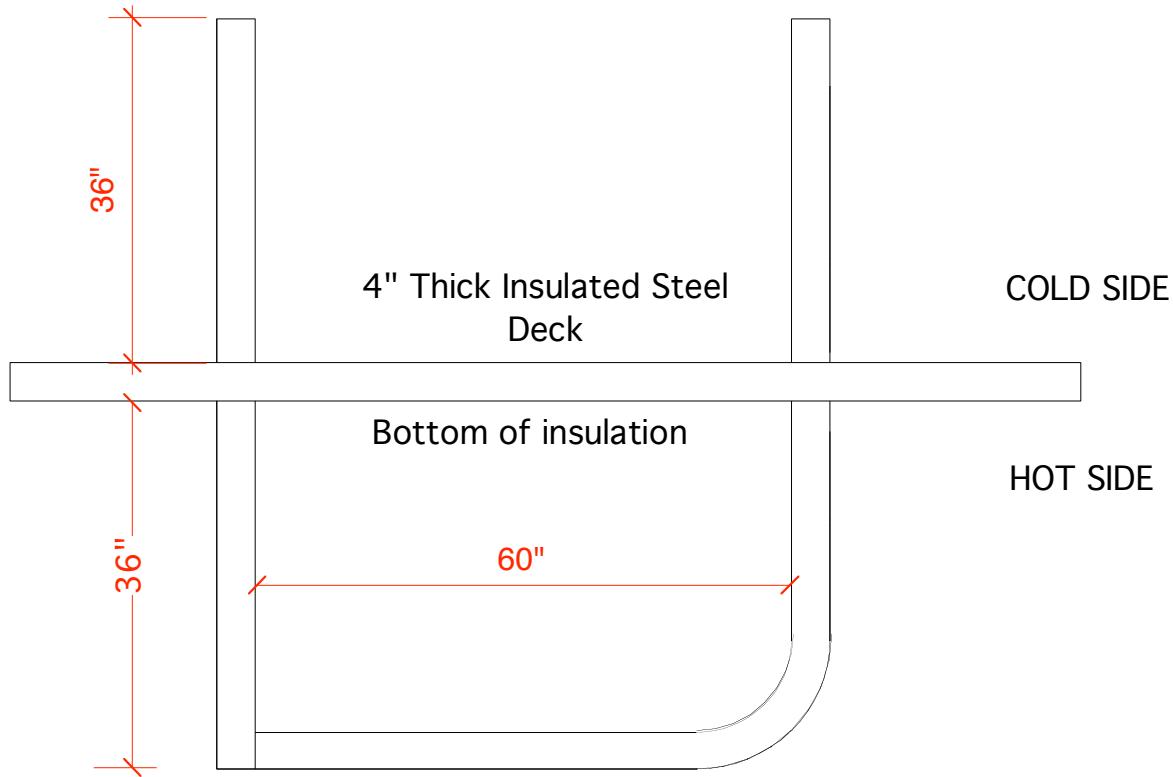
Scale=1:35



Note:

The lower perimeter steel consisted of C4x5.4 channel, positioned with flanges outwards, completely around the deck. Over the channel was placed a continuously-welded layer of 10 GA. hot-rolled steel plate. Over the steel plate was placed C5x6.7 channel, mounted with the flanges outwards from the shorter ends, and with flanges away from the interior of each opening (indicated by cross-hatching).

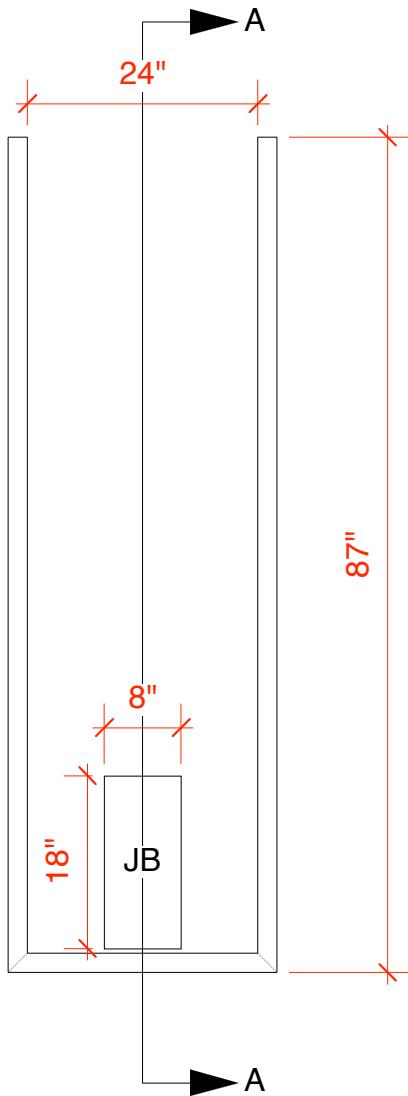
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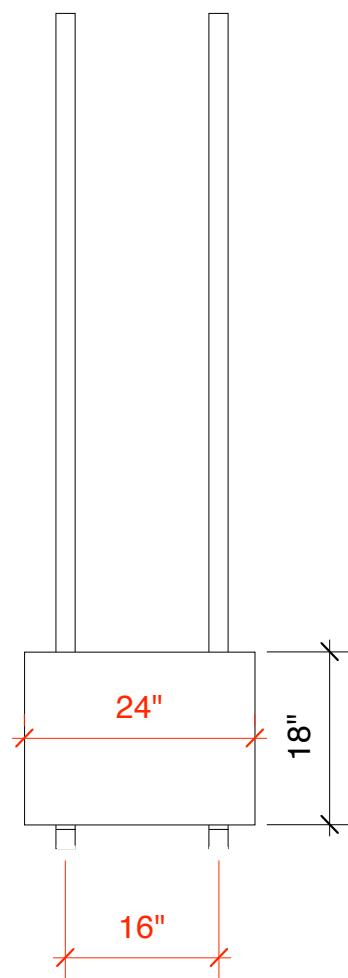
12" & 36" WIDE CABLE TRAYS
SIDE ELEVATION VIEW
(Right rail towards viewer)

OMEGA POINT LABORATORIES, INC. Project No. 14790-123264
SANDIA NATIONAL LABORATORIES
Fig. 4, Rev. 1 Test 2 Assembly Cable Tray Dimensions
Drwn by:D.N.Priest Date: 1/25/05 OPL App'l: <i>C. Humphrey</i> te: 1/25/05 Sandia App'l: Date:

Scale=1:20



SIDE VIEW



SECTION A-A

Note:

The Unistrut supports for the junction box were constructed to the dimensions indicated. The bottom of the junction box was located 45" below the under side of the insulated deck. The JB was not attached to the supports. The 2" stand-off frame (not shown) was attached and then the JB was placed back on the support frame.

OMEGA POINT LABORATORIES, INC.
Project No. 14790-123264

SANDIA NATIONAL LABORATORIES

Fig. 5 Test 2 Assembly
Junction Box Supports

Drwn by:D.N.Priest	Date: 1/25/05
OPL App'l: <i>C. Humphrey</i>	te: 1/25/05
Sandia App'l:	Date:

Scale=1:20

Appendix C

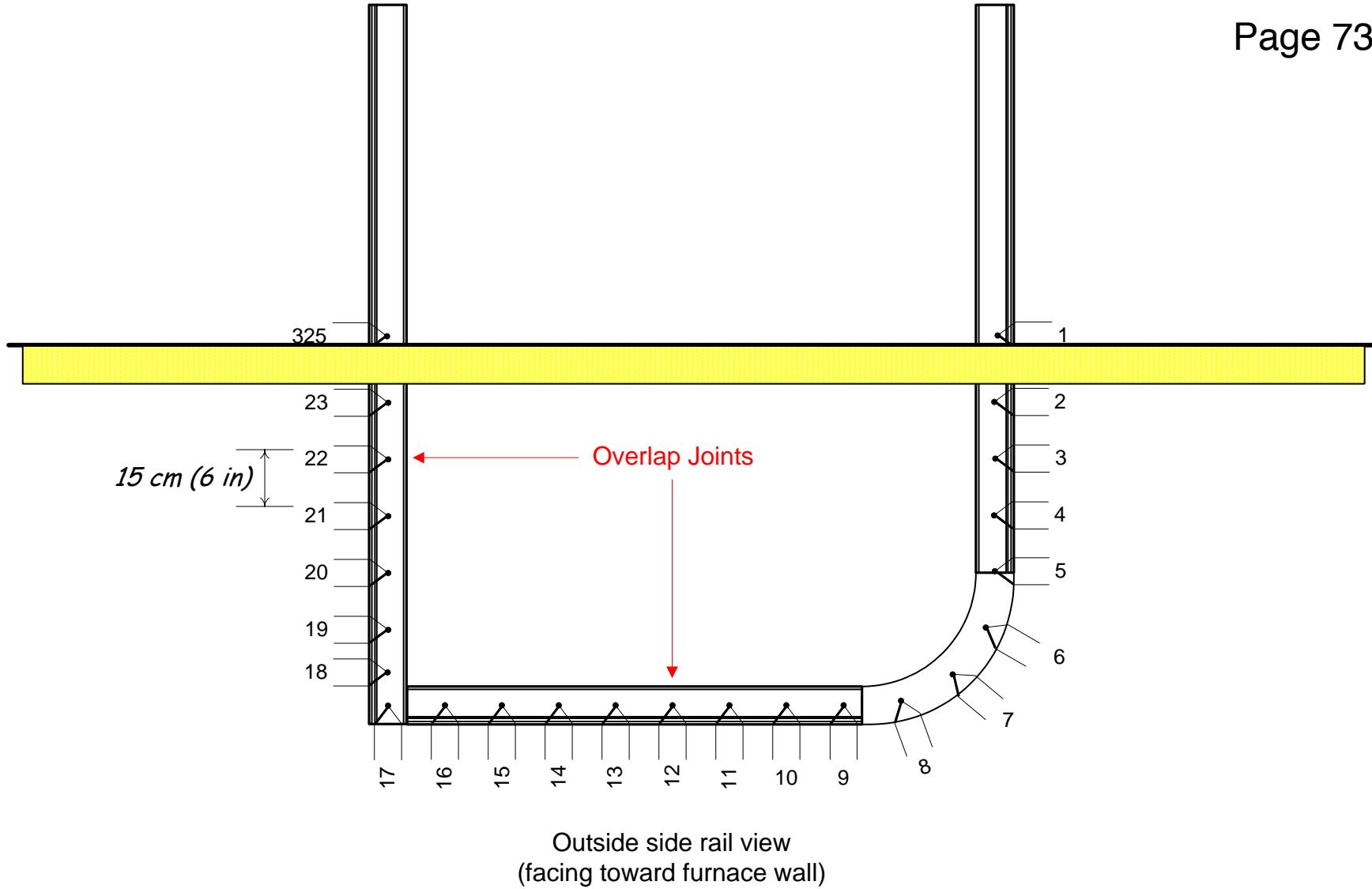
THERMOCOUPLE LOCATIONS



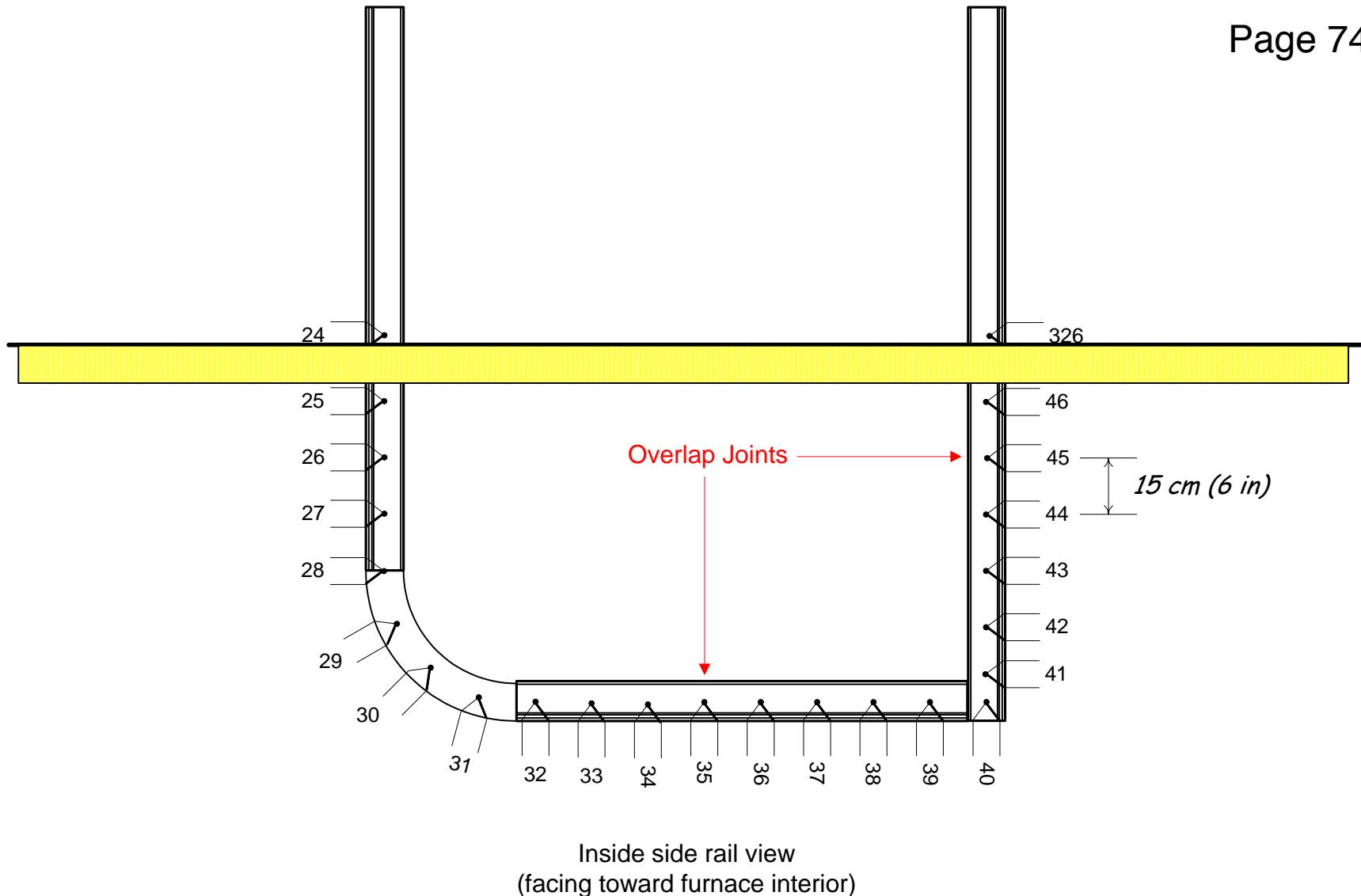
THERMOCOUPLE LOCATION DRAWINGS

Test #2 – Hemyc, Direct Attachment and Framed for Air Gap

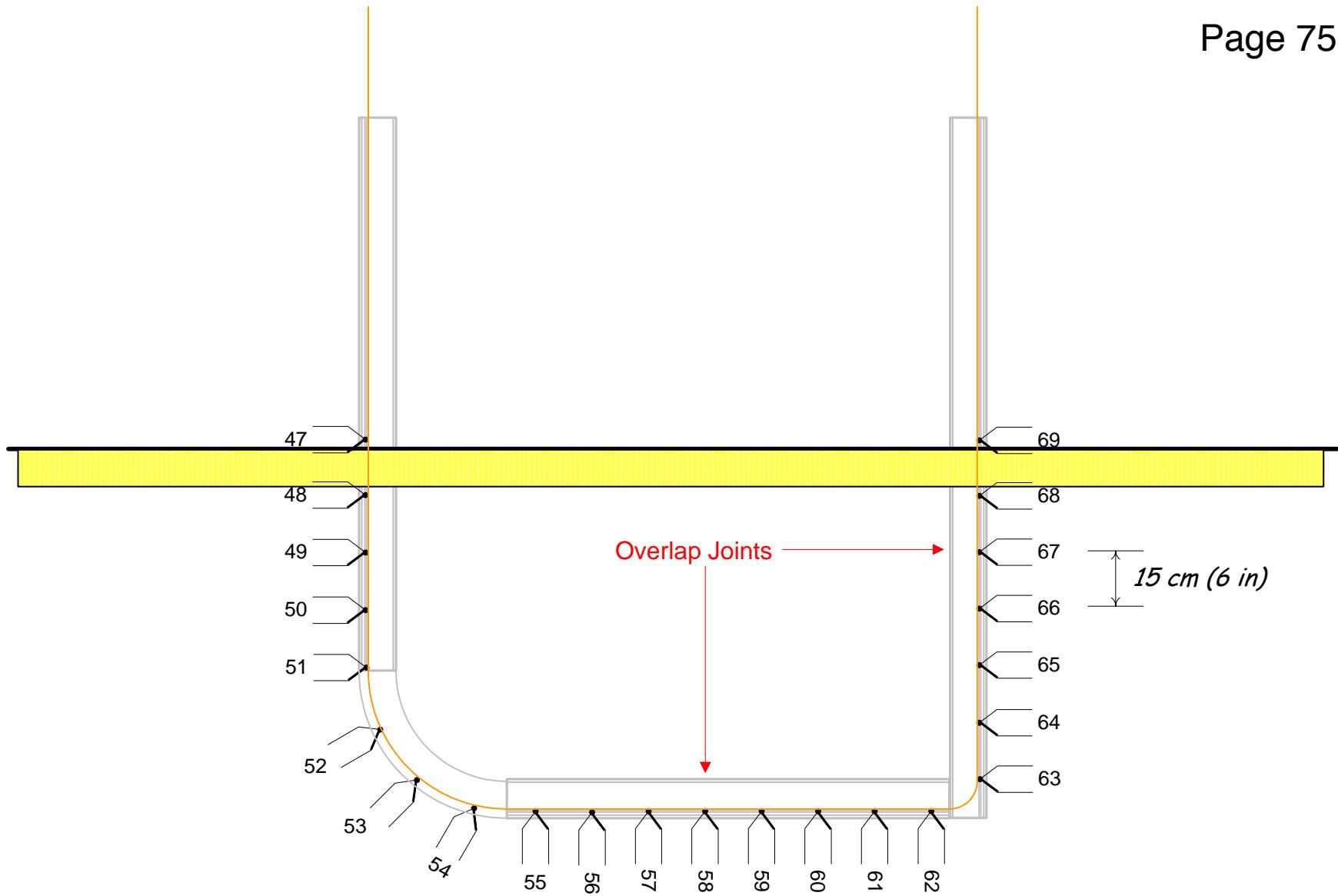
Revised 03/29/05



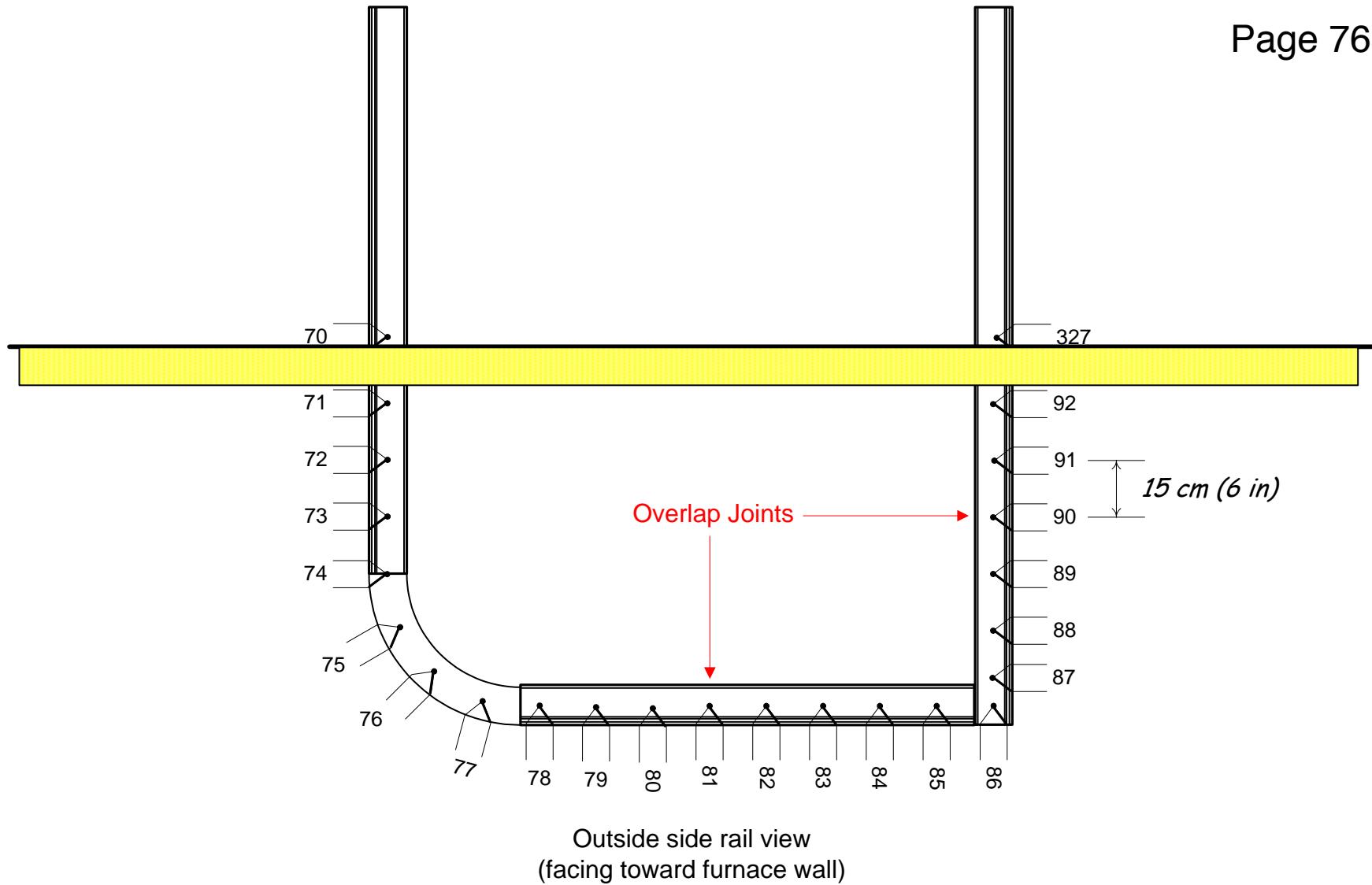
Test Specimen 2A – Empty 12-inch cable tray thermocouple locations and tag numbers. (Direct Attachment Hemyc wraps and banded.)



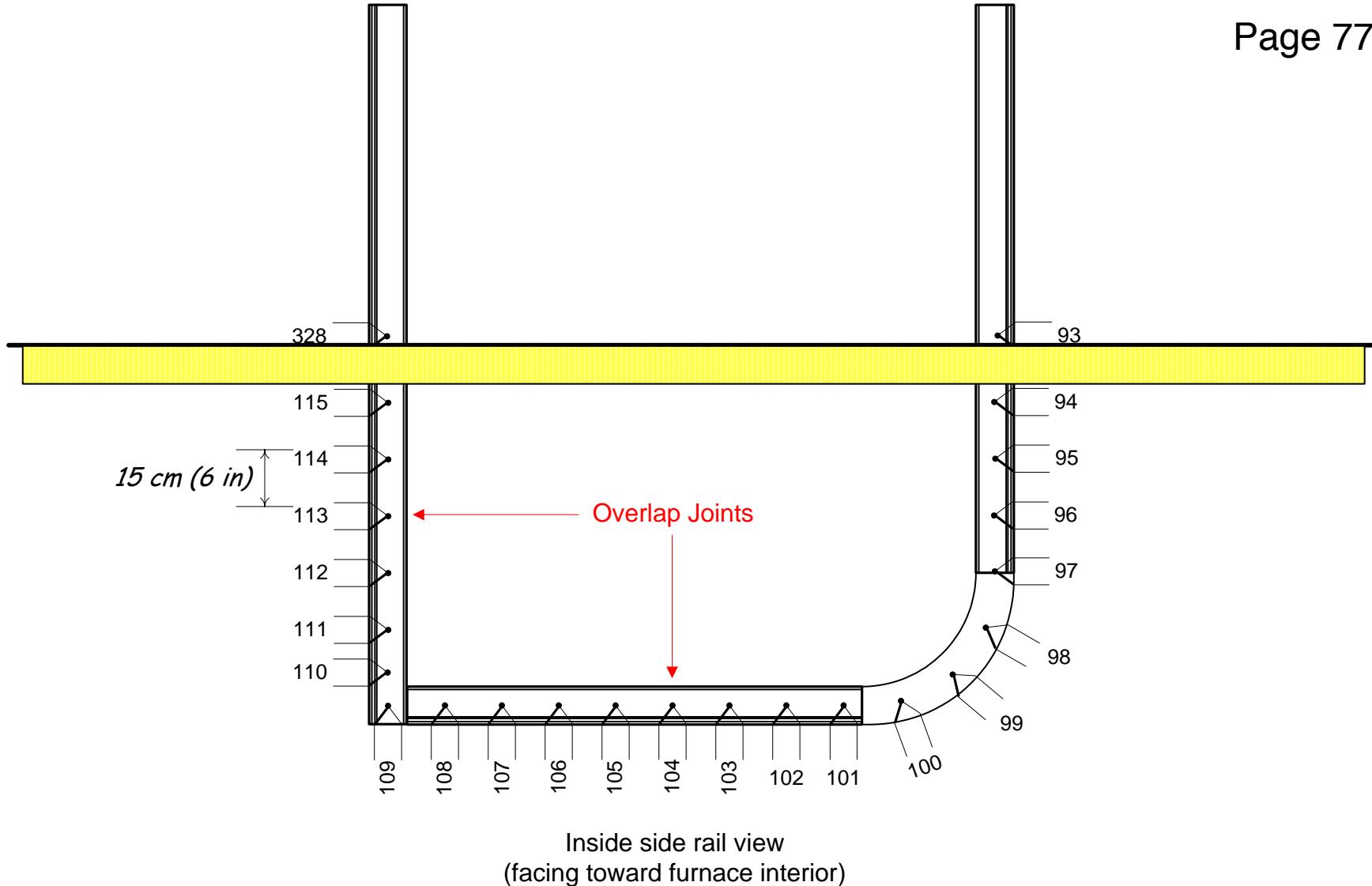
Test Specimen 2A – Empty 12-inch cable tray thermocouple locations and tag numbers. (Direct Attachment Hemyc wraps and banded.)



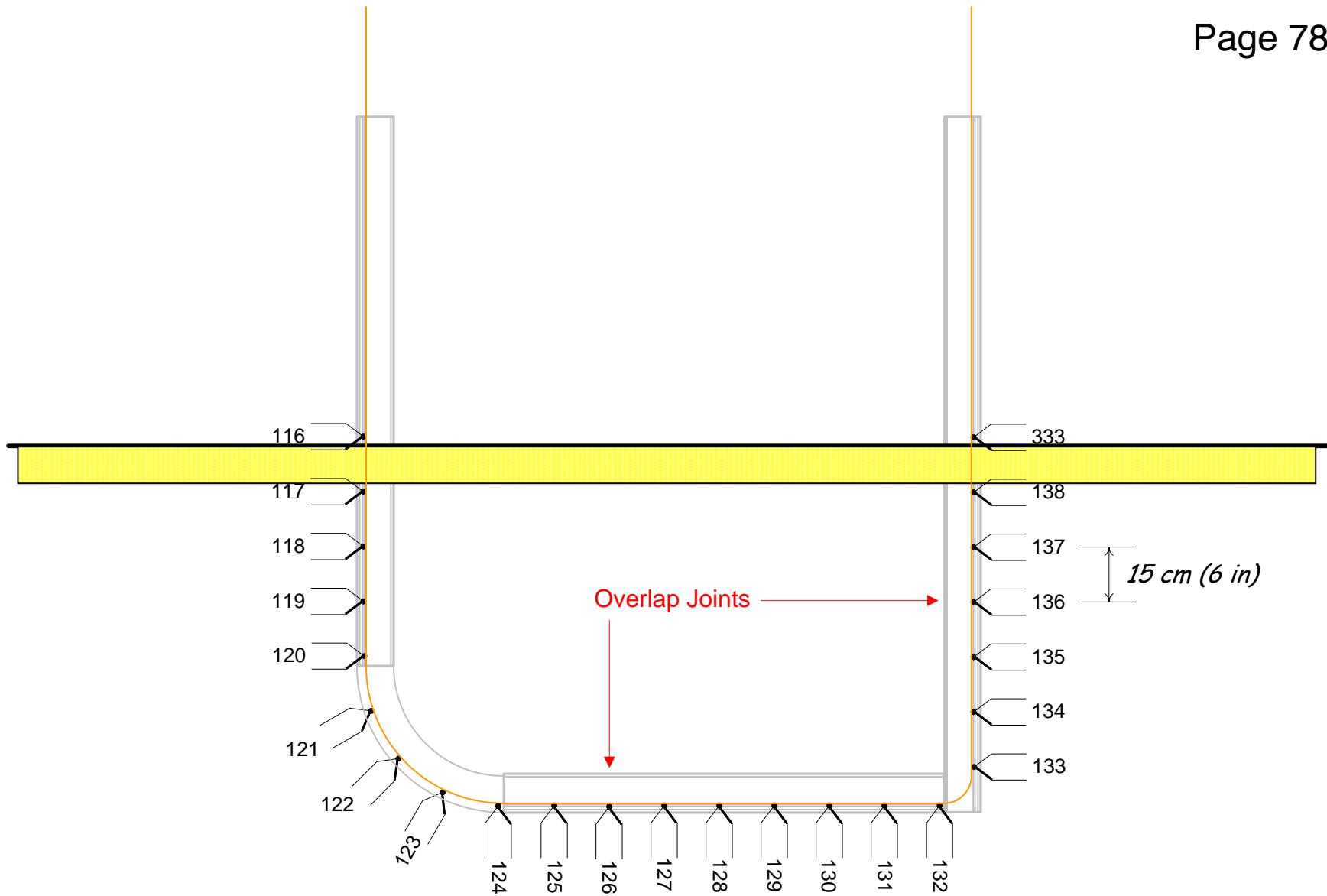
Test Specimen 2A – Empty 12-inch cable tray thermocouple locations and tag numbers on bare #8 copper wire. Note: Some uncertainty in exact thermocouple locations exists. (Direct Attachment Hemyc wraps and banded.)



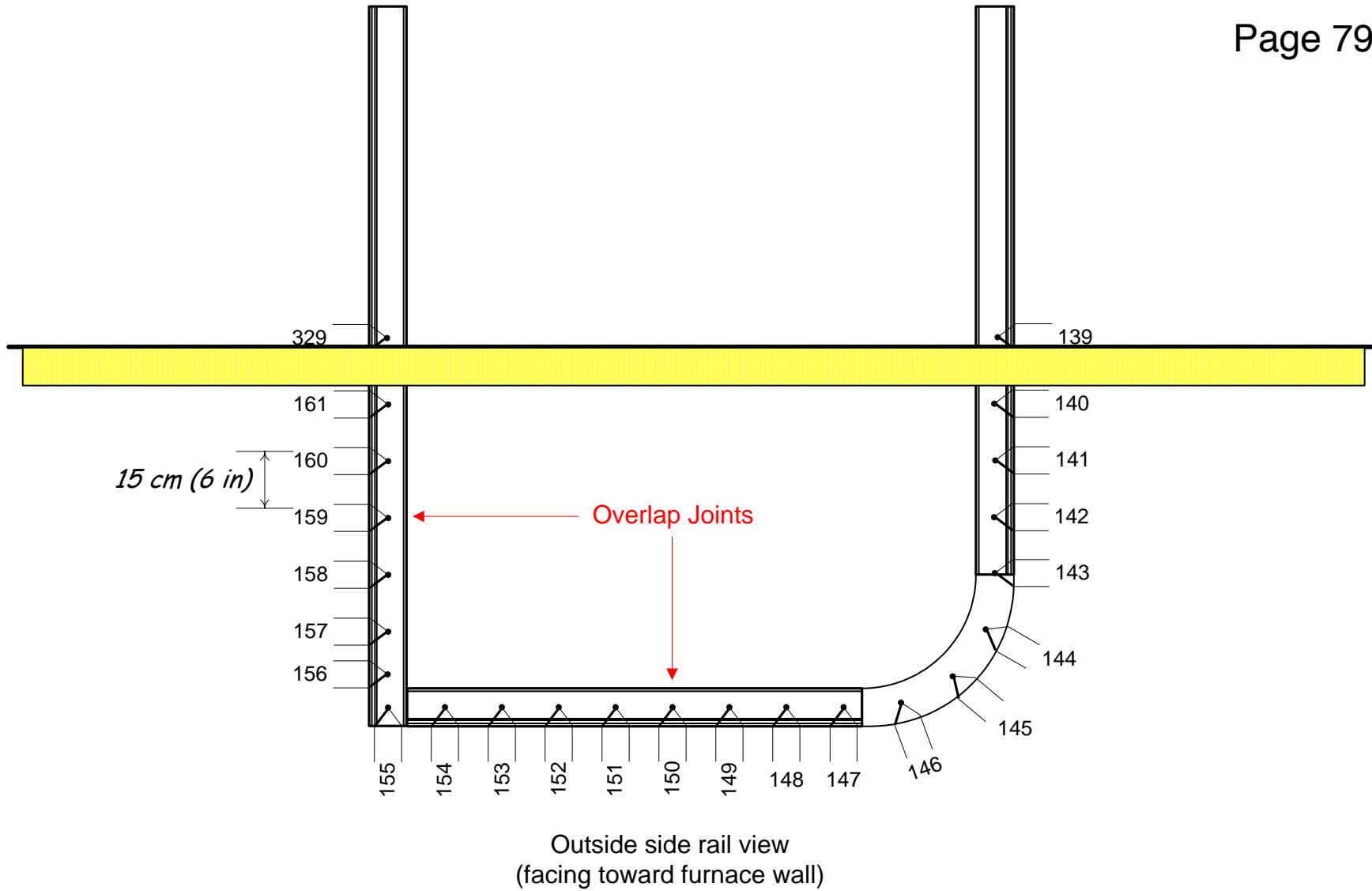
Test Specimen 2B – Empty 12-inch cable tray thermocouple locations and tag numbers. (Hemyc wrap framed for 2" Air Gap)



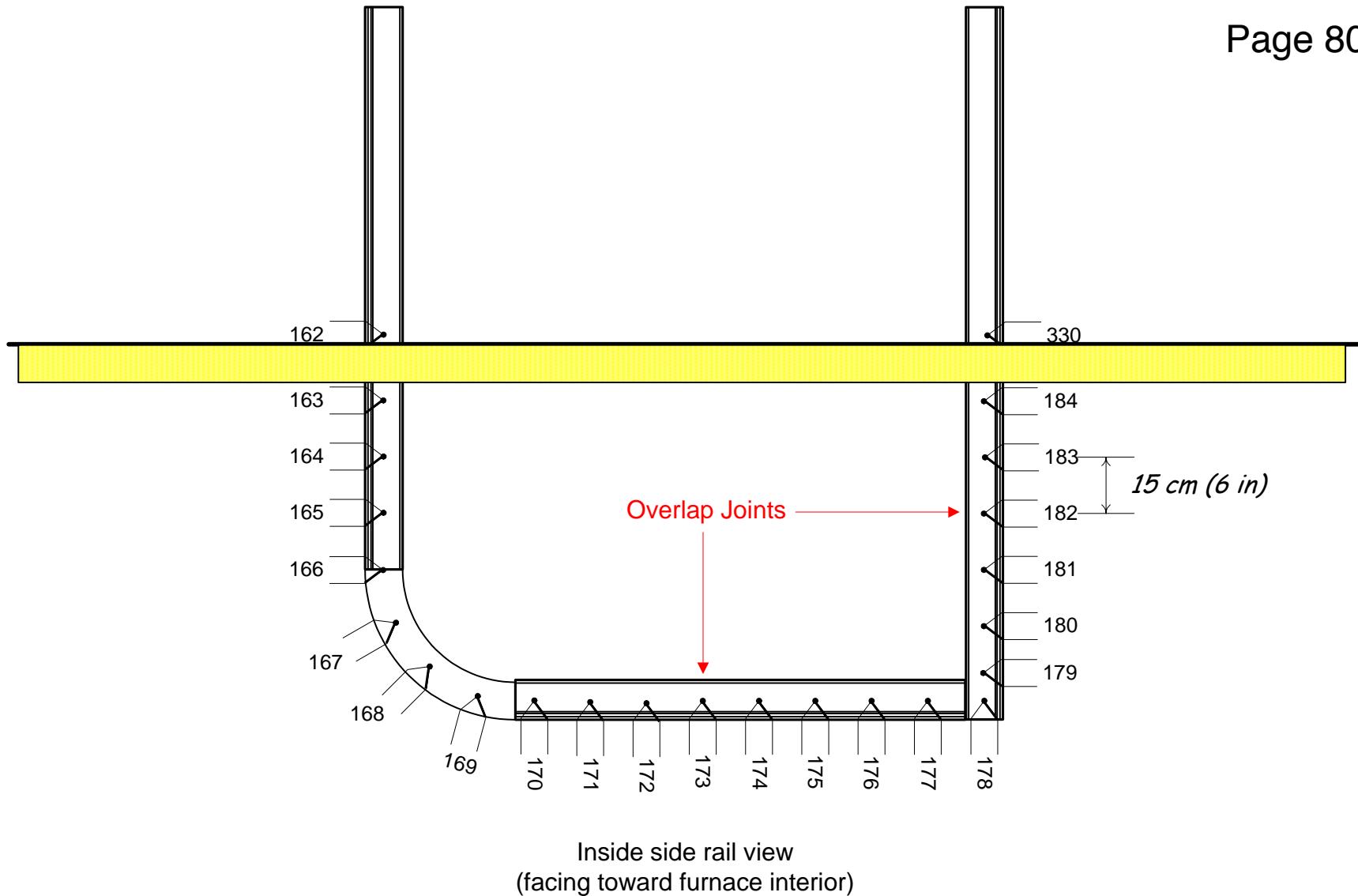
Test Specimen 2B – Empty 12-inch cable tray thermocouple locations and tag numbers. (Hemyc wrap framed for 2" Air Gap)



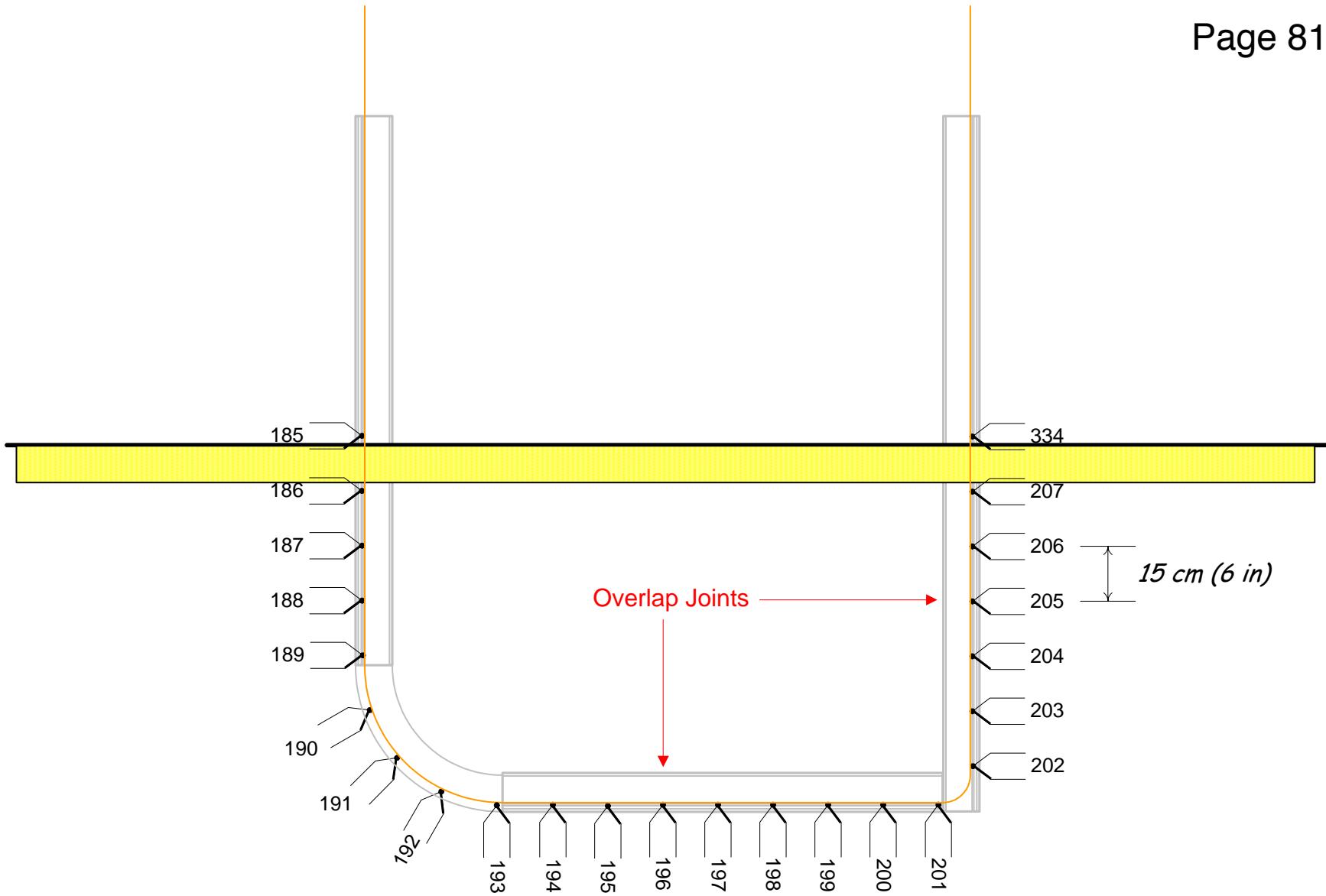
Test Specimen 2B – Empty 12-inch cable tray thermocouple locations and tag numbers on bare #8 copper wire. Note: Some uncertainty in exact thermocouple locations exists. (Hemyc wrap framed for 2" Air Gap)



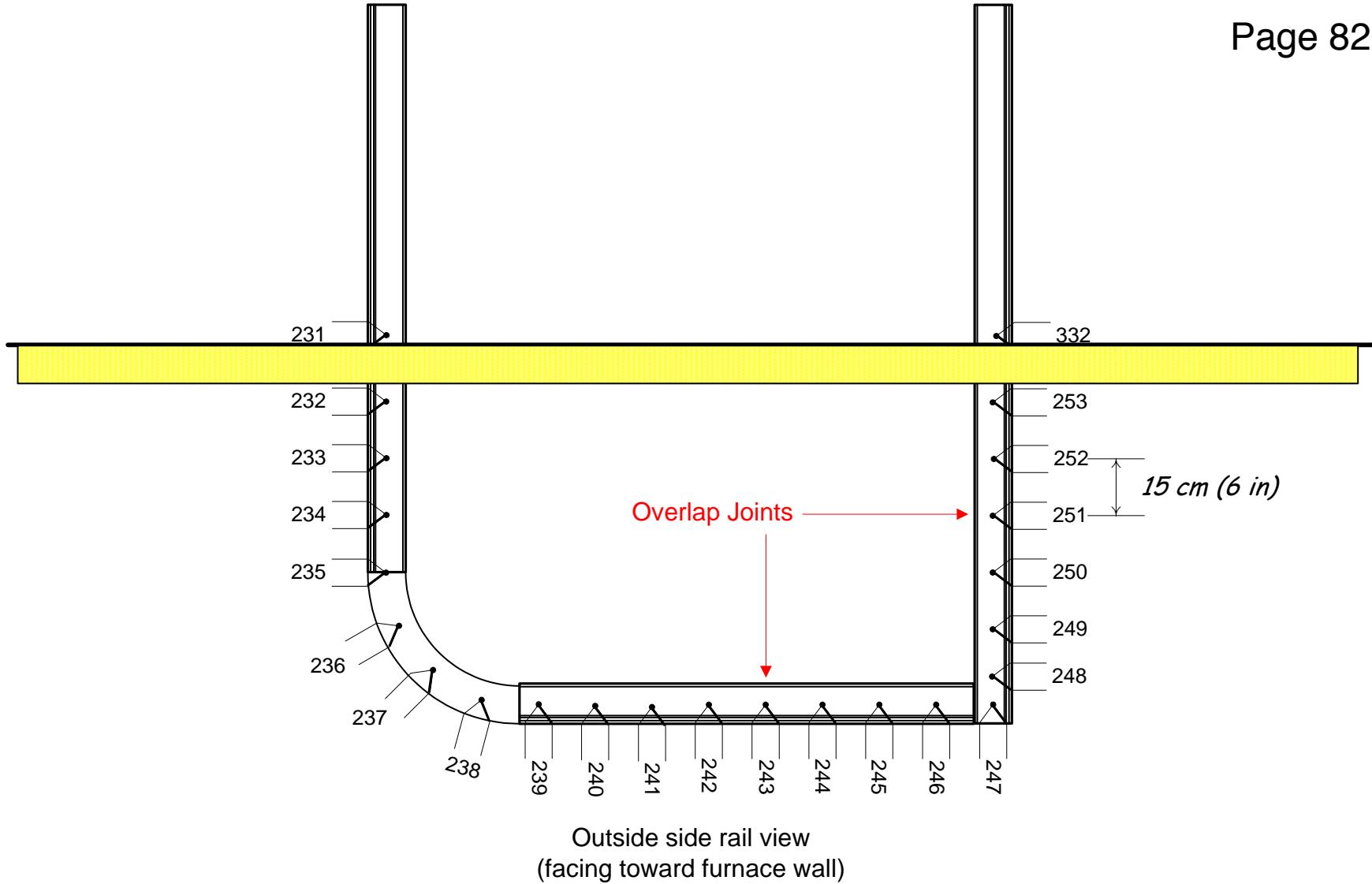
Test Specimen 2C – Empty 36-inch cable tray thermocouple locations and tag numbers. (Direct Attachment Hemyc wraps and banded.)



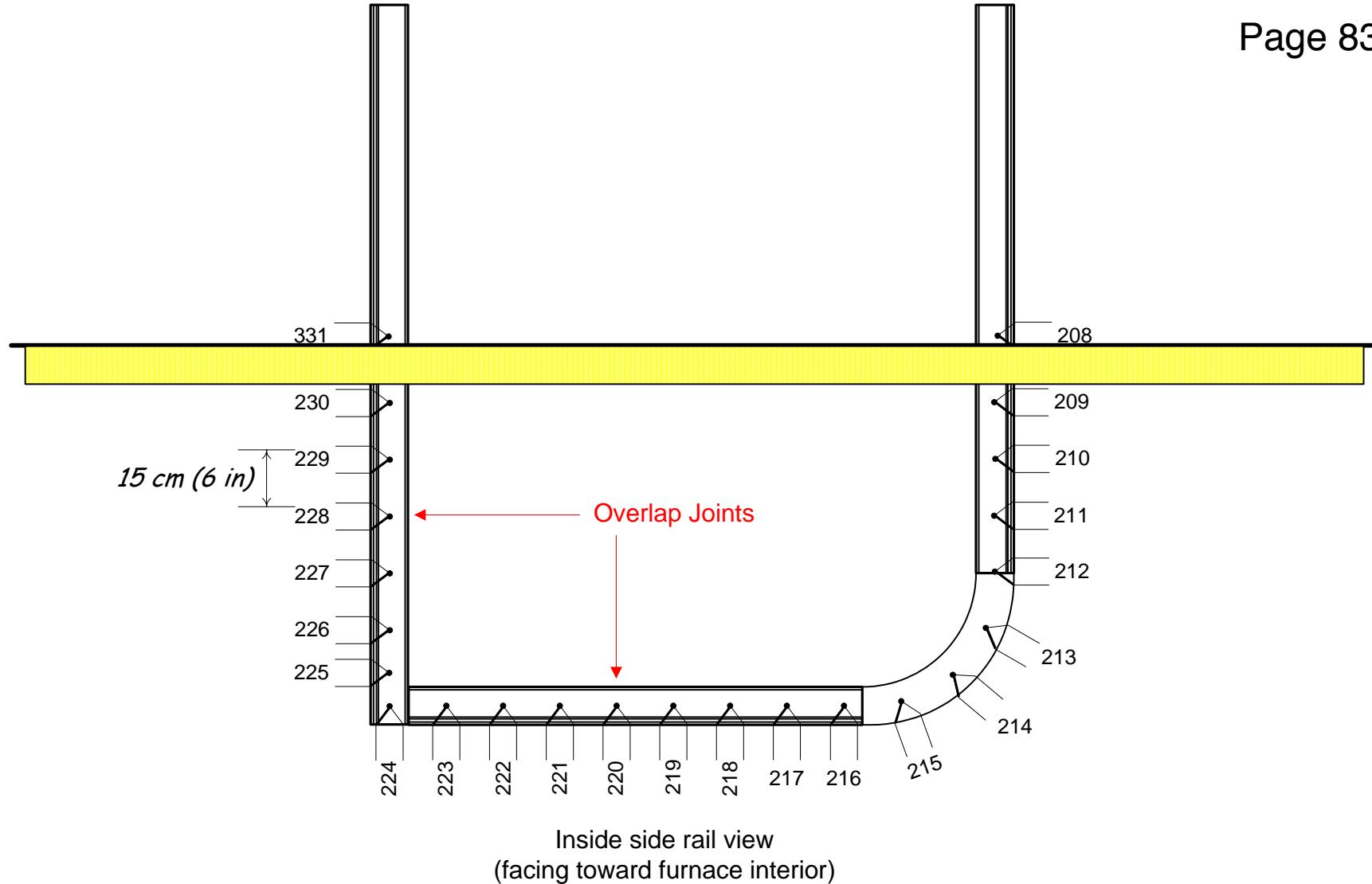
Test Specimen 2C – Empty 36-inch cable tray thermocouple locations and tag numbers. (Direct Attachment Hemyc wraps and banded.)



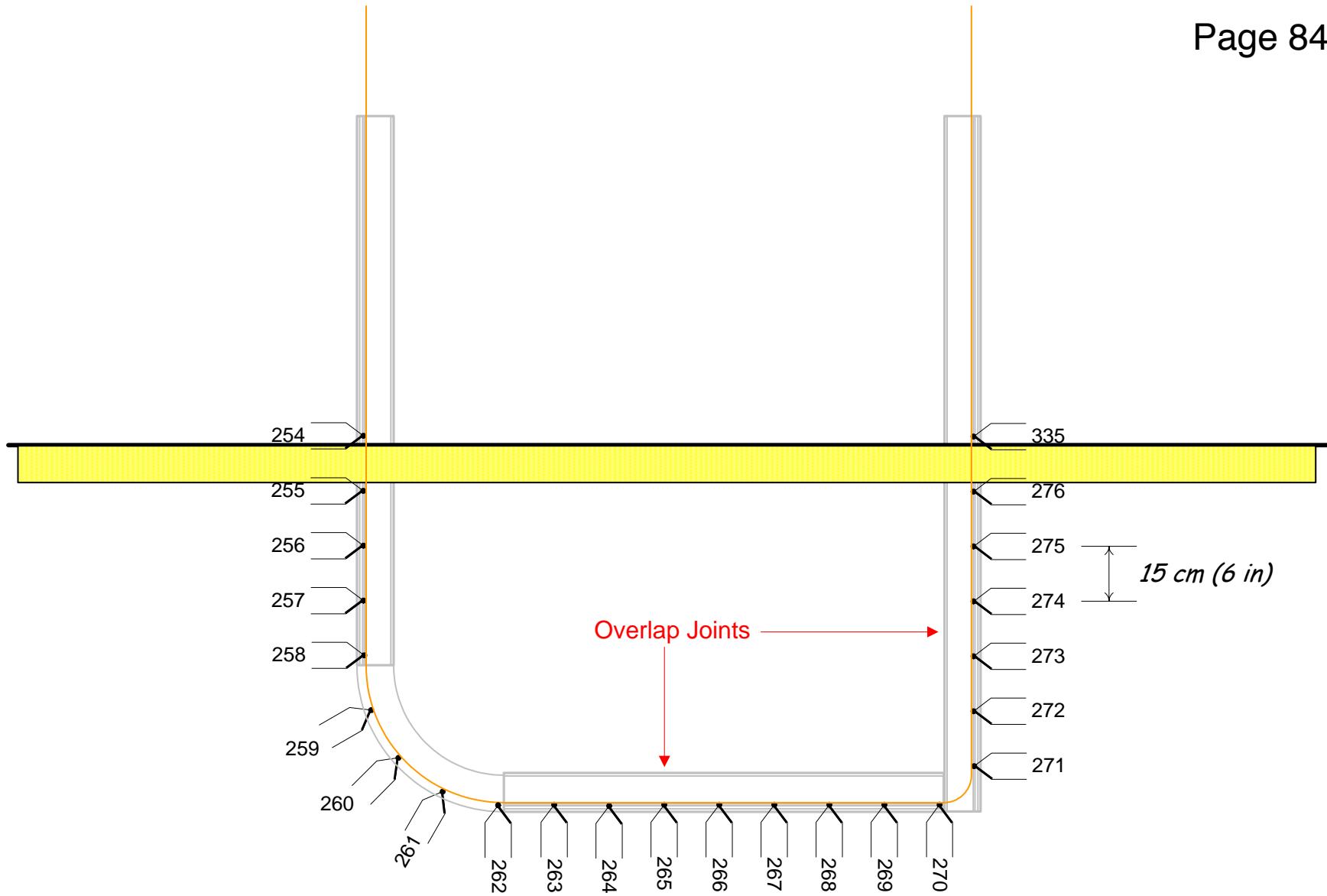
Test Specimen 2C – Empty 36-inch cable tray thermocouple locations and tag numbers on bare #8 copper wire. Note: Some uncertainty in exact thermocouple locations exists. (Direct Attachment Hemyc wraps and banded.)



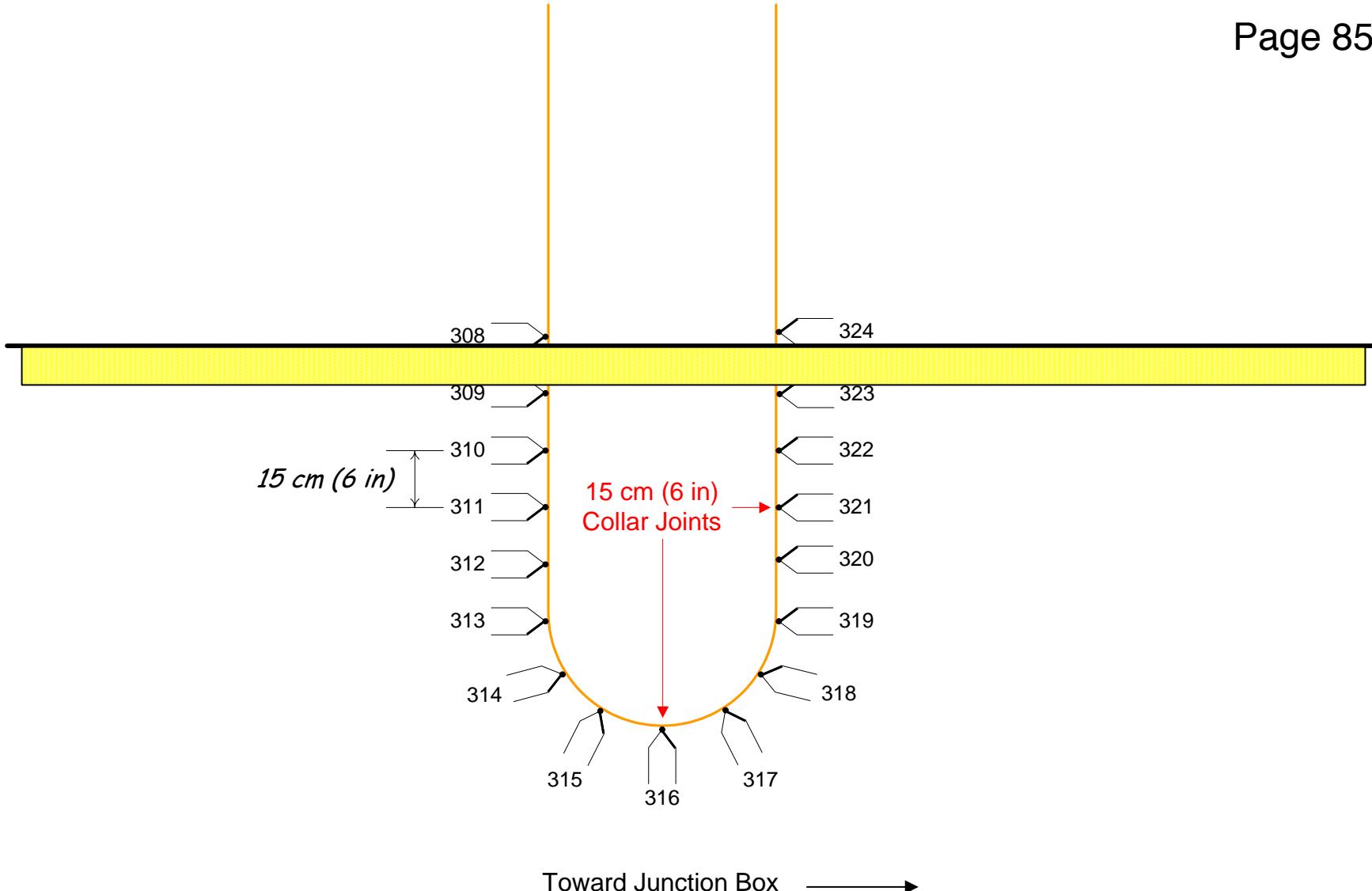
Test Specimen 2D – Empty 36-inch cable tray thermocouple locations and tag numbers. (Hemyc wrap framed for 2" Air Gap)



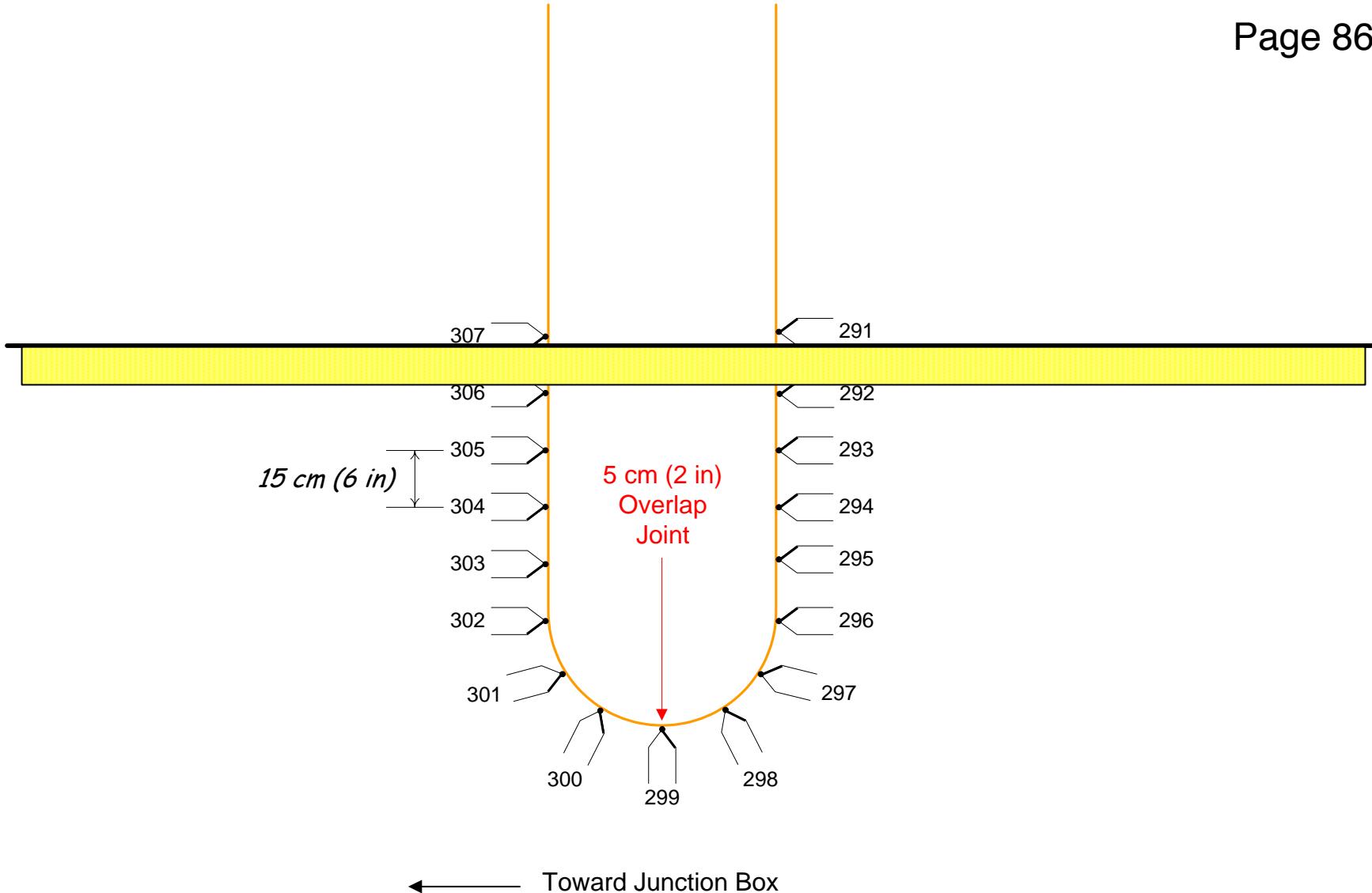
Test Specimen 2D – Empty 36-inch cable tray thermocouple locations and tag numbers. (Hemyc wrap framed for 2" Air Gap)



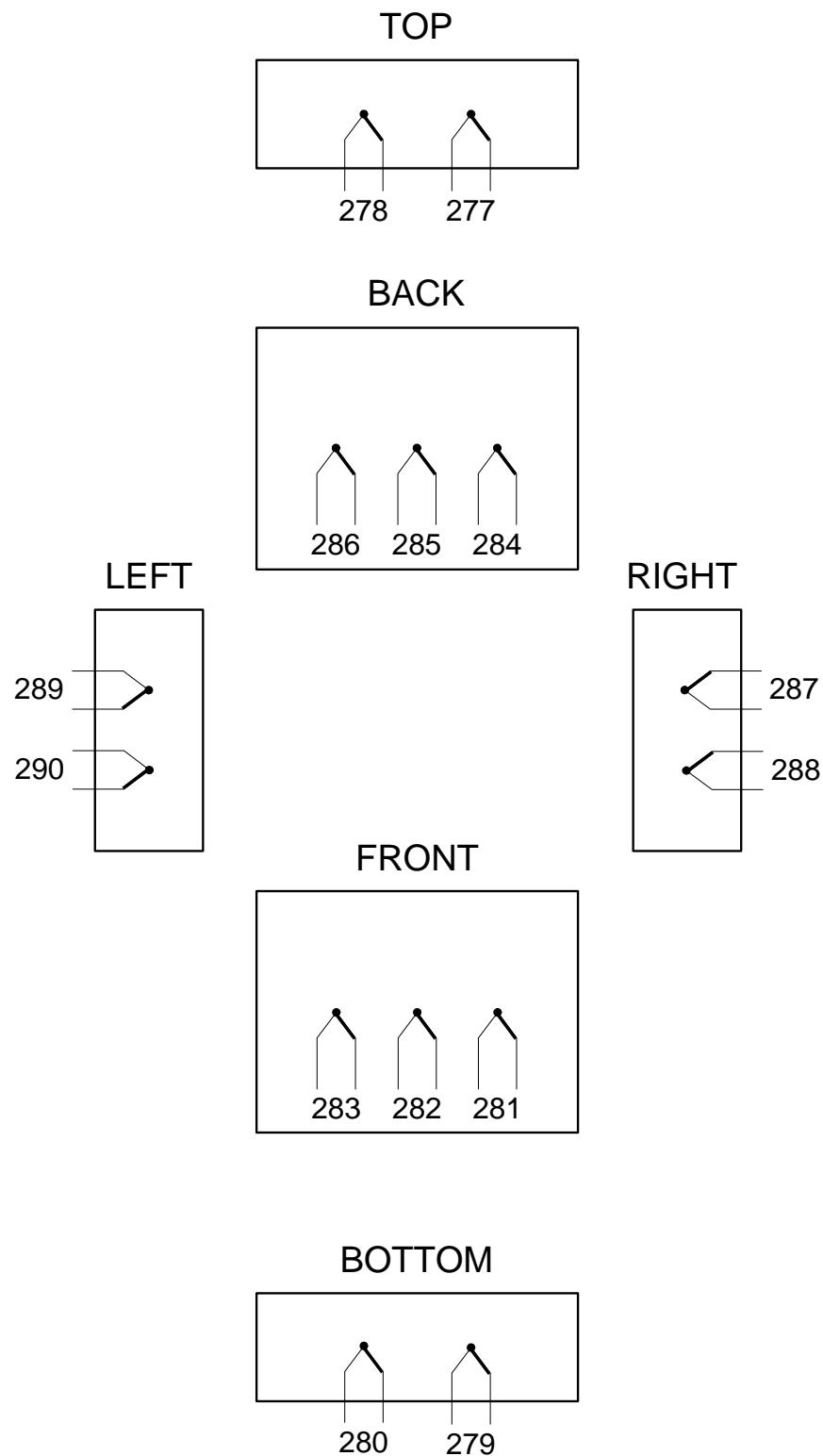
Test Specimen 2D – Empty 36-inch cable tray thermocouple locations and tag numbers on bare #8 copper wire. Note: Some uncertainty in exact thermocouple locations exists. (Hemyc wrap framed for 2" Air Gap)



Test Specimen 2E – Cable Drop Loop thermocouple locations and tag numbers. (Direct Attachment Hemyc wraps and banded.)



Test Specimen 2F – Cable Drop Loop thermocouple locations and tag numbers. (Hemyc wrap framed for 2" Air Gap and banded.)



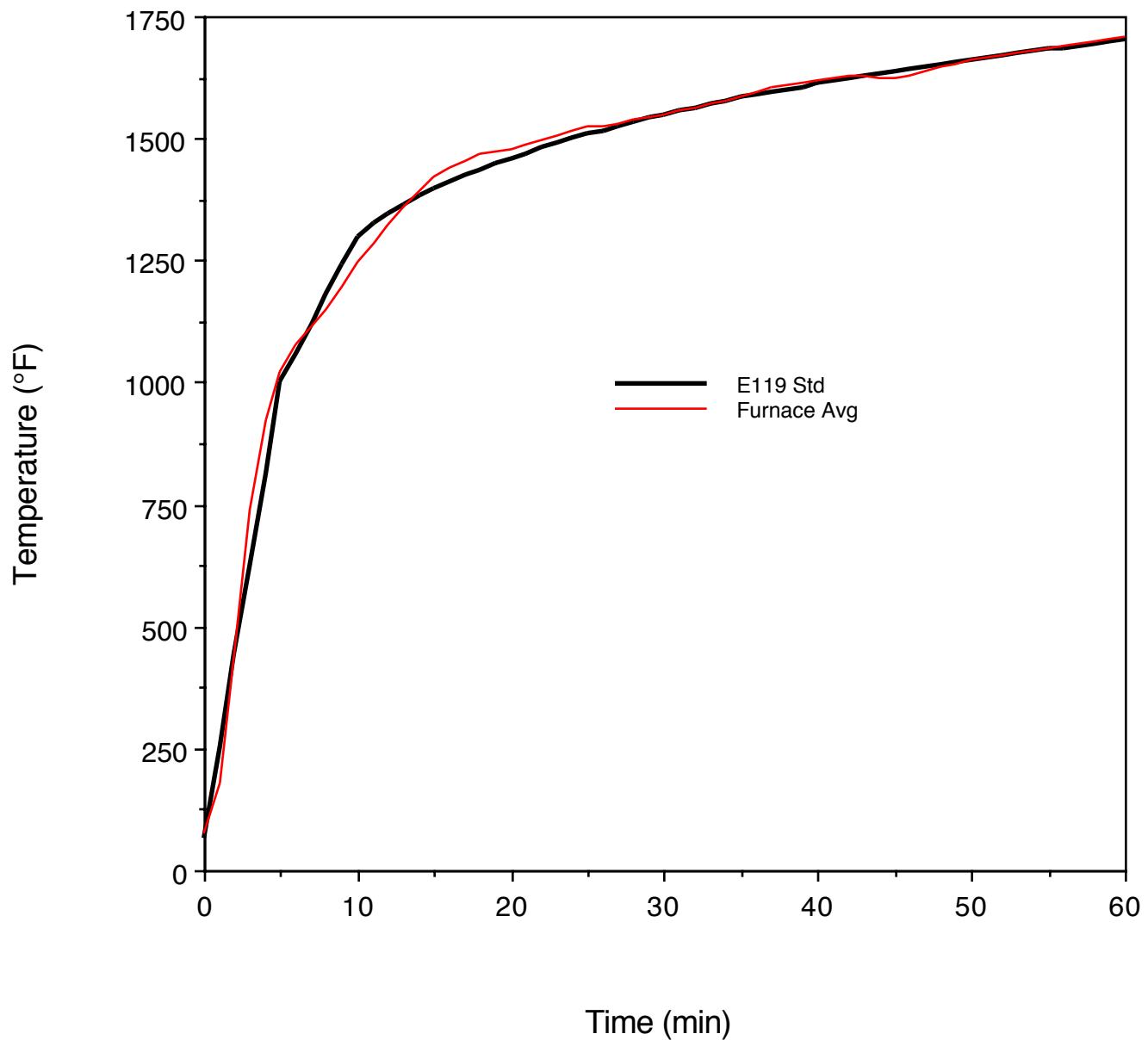
Test Specimen 2G – Junction box thermocouple locations and tag numbers. Note: Back panel is transparent to show correct orientation of thermocouple locations. (Direct Attachment Hemyc wraps and banded.)

Appendix D

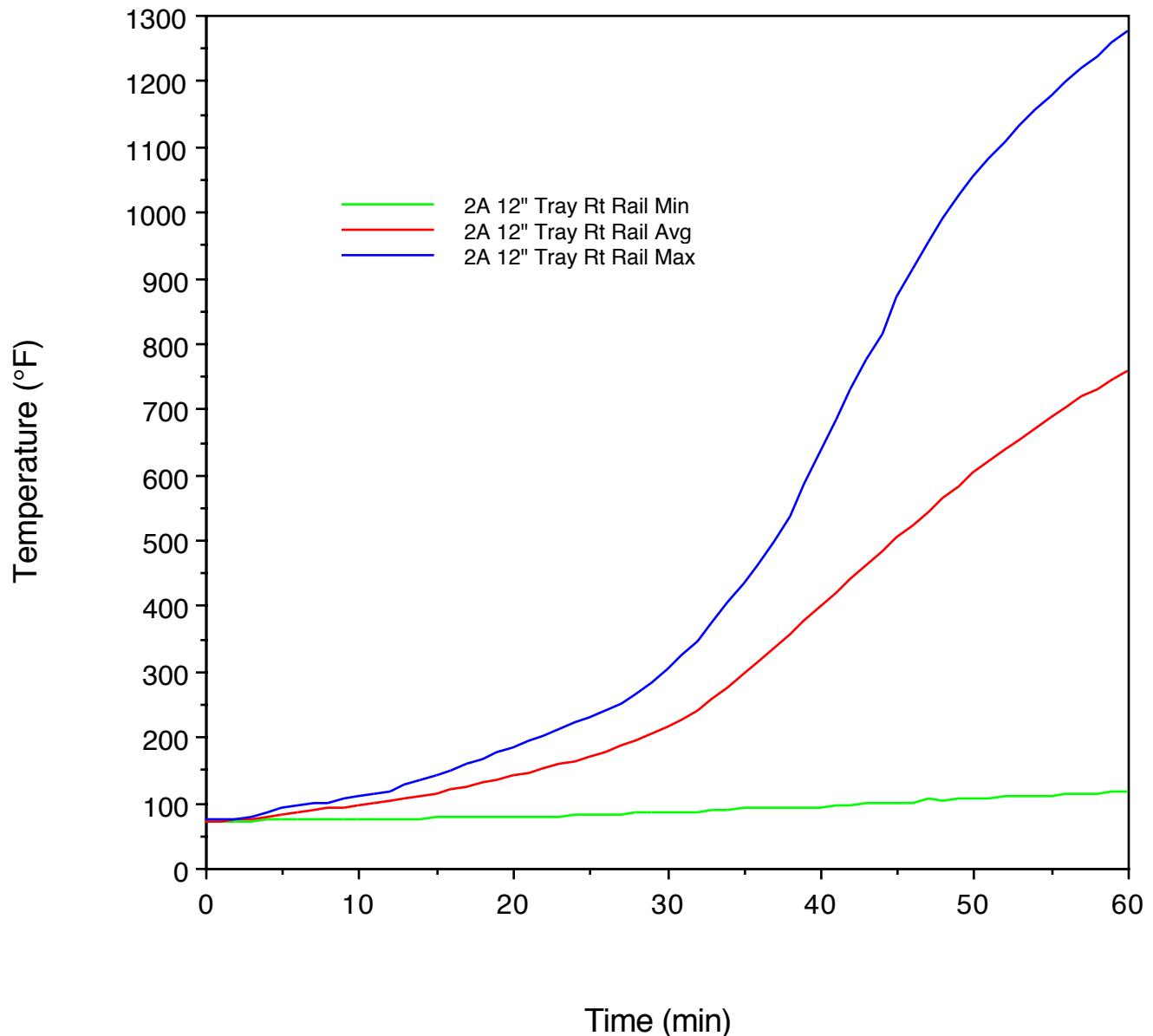
TEST DATA



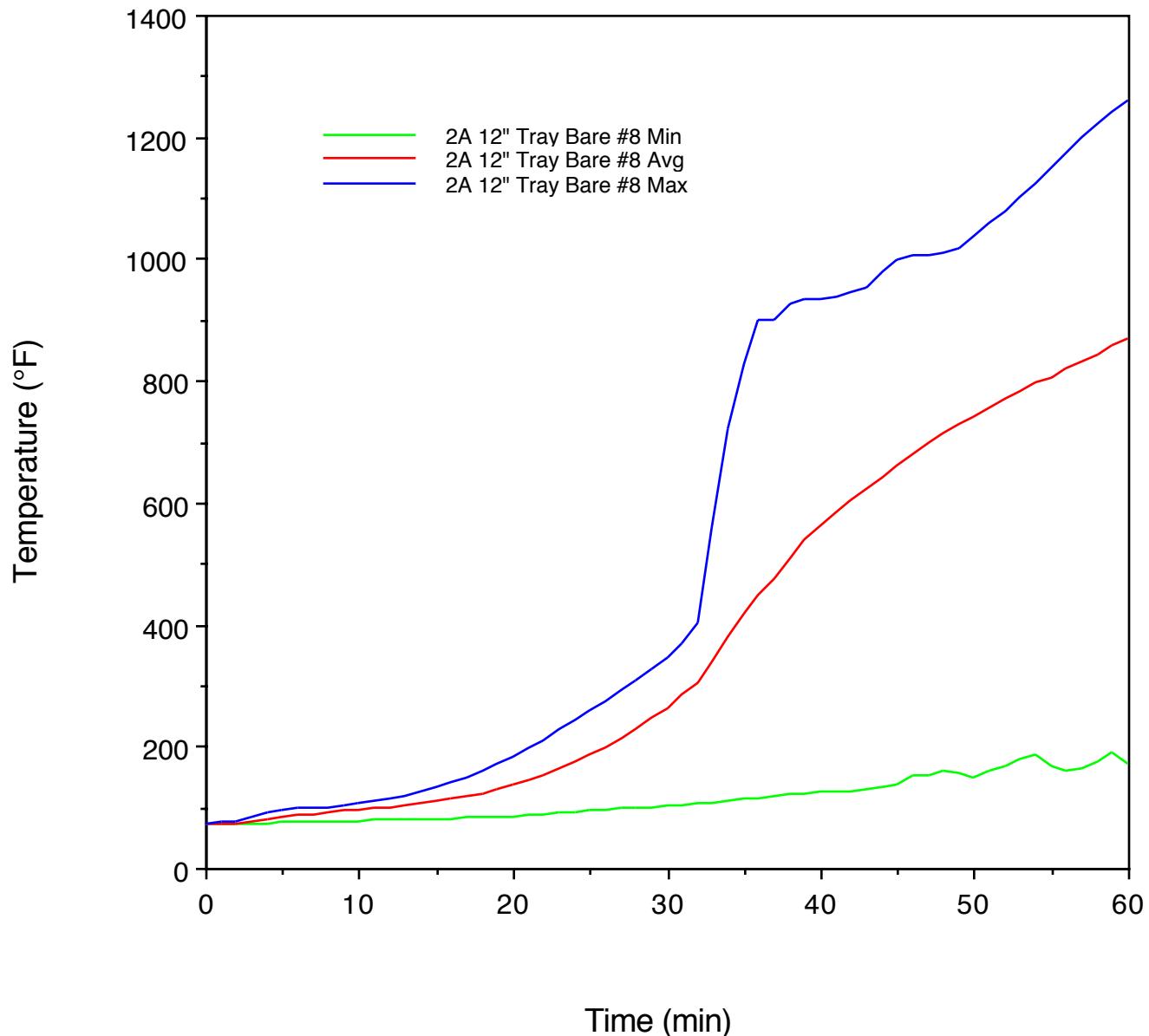
Project No. 14790-123264
Sandia National Laboratories
Furnace Interior Temperatures



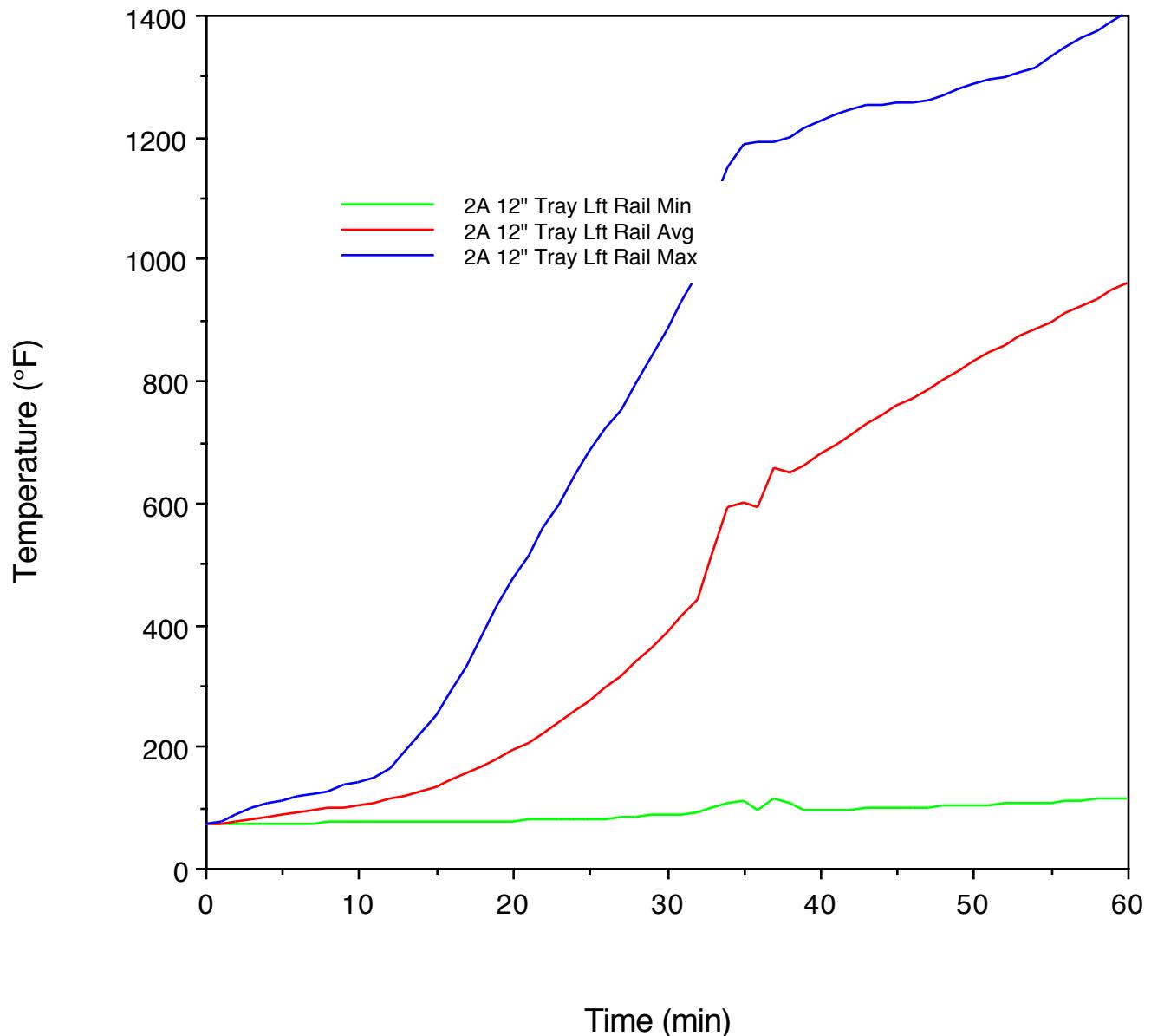
Project No. 14790-123264
Sandia National Laboratories
Item 2A: 12" Tray; Right Rail Min, Avg & Max



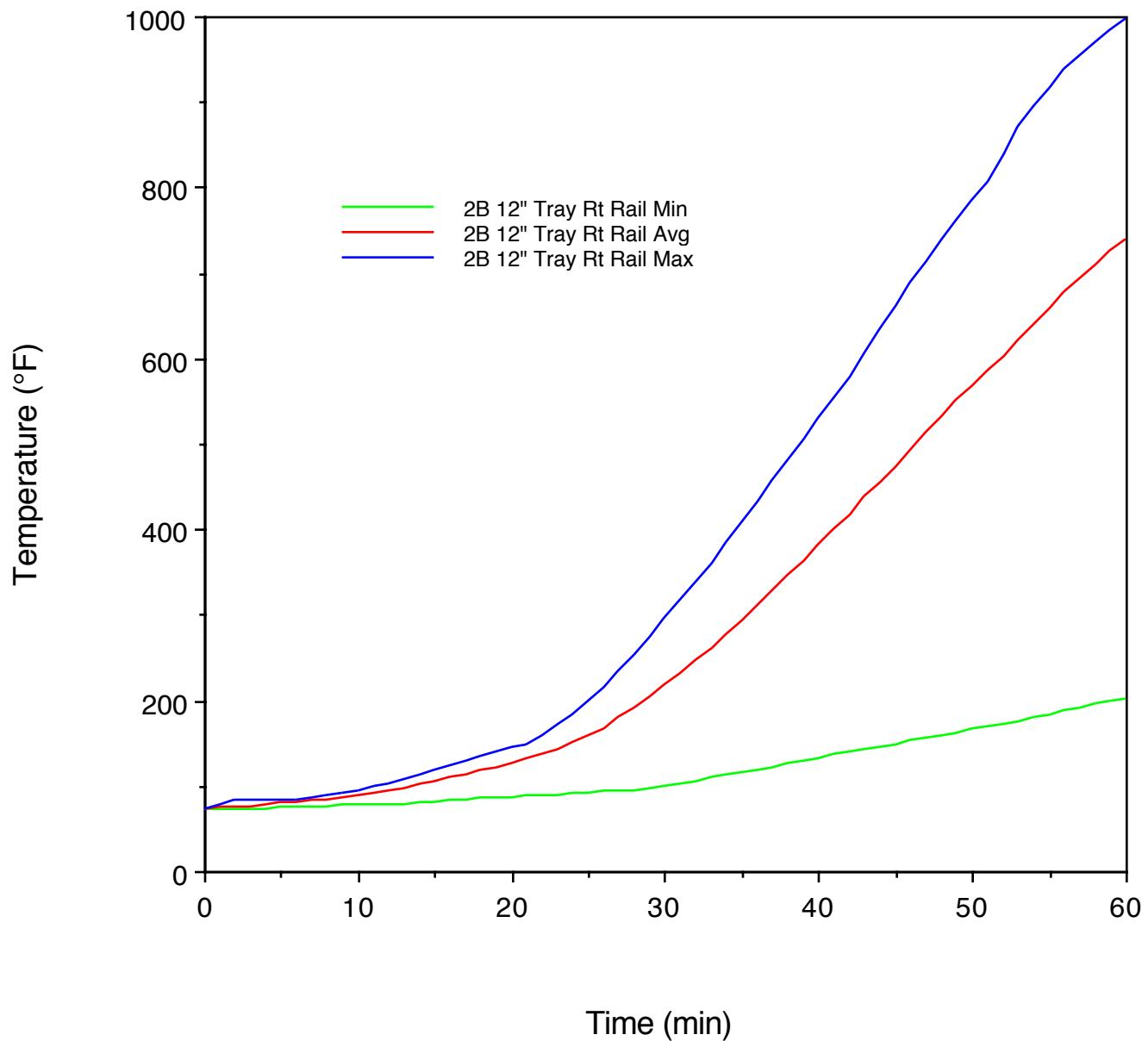
Project No. 14790-123264
Sandia National Laboratories
Item 2A: 12" Tray; Bare #8 Min, Avg & Max



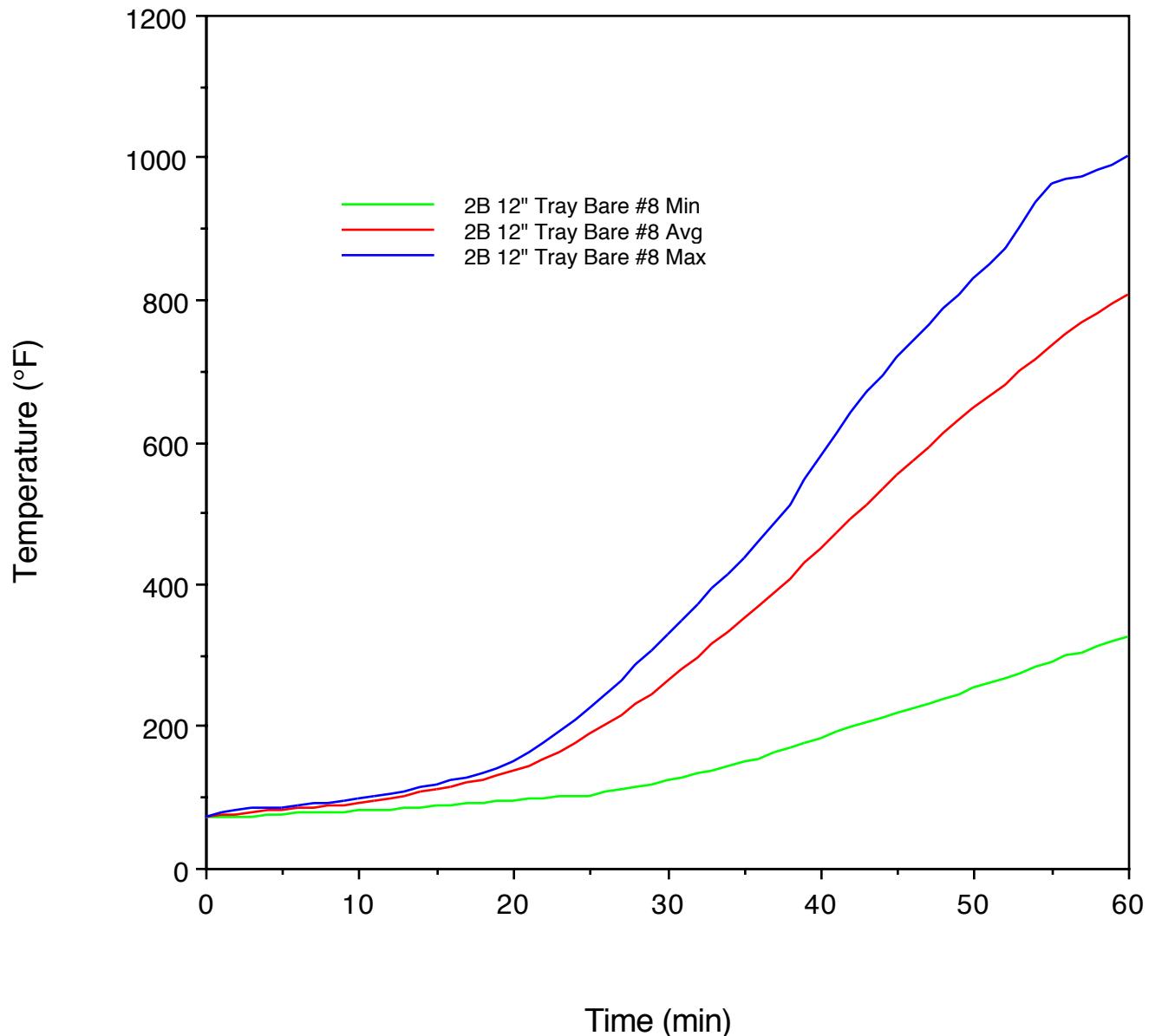
Project No. 14790-123264
Sandia National Laboratories
Item 2A: 12" Tray; Left Rail Min, Avg & Max



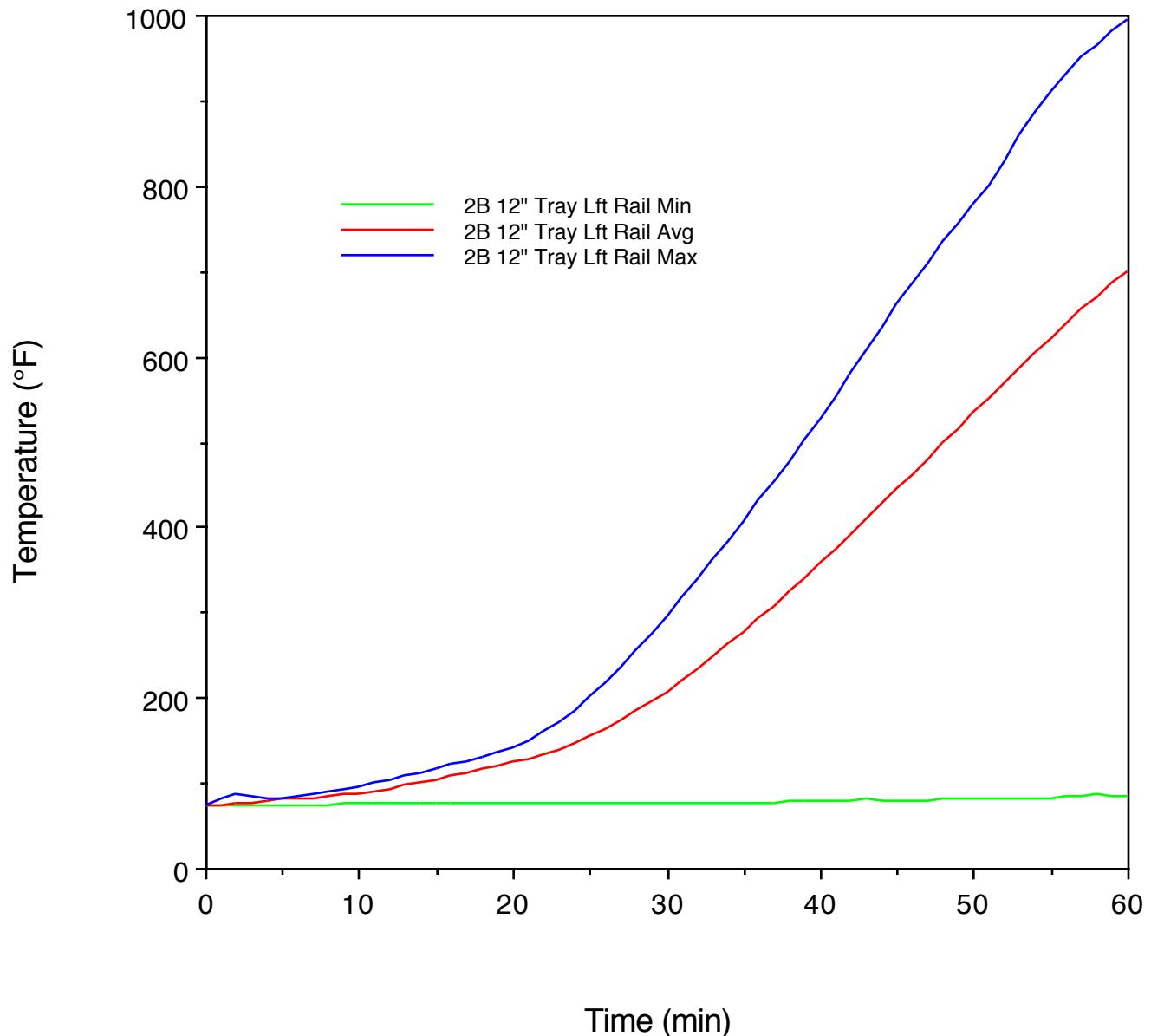
Project No. 14790-123264
Sandia National Laboratories
Item 2B: 12" Tray; Right Rail Min, Avg & Max



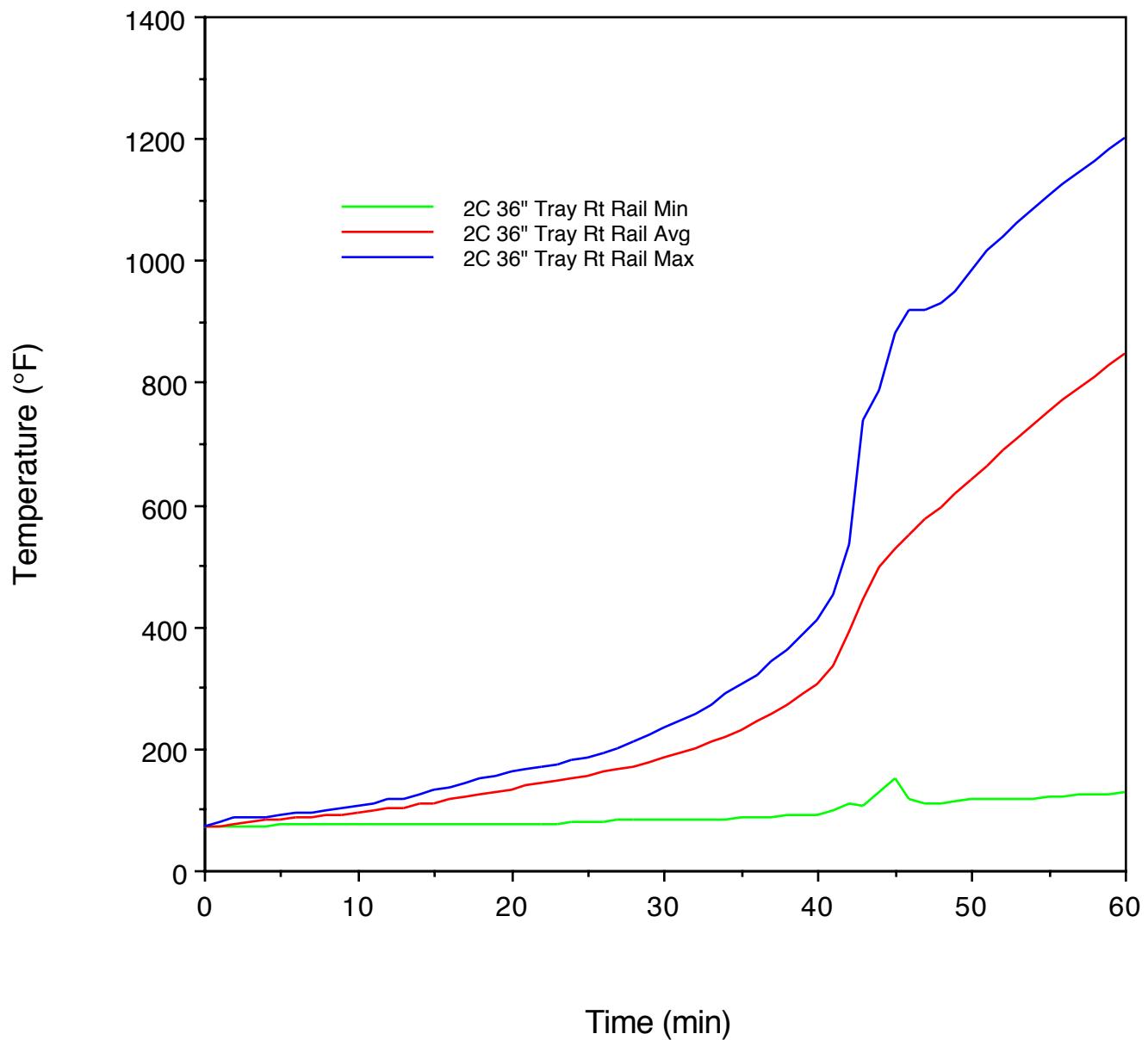
Project No. 14790-123264
Sandia National Laboratories
Item 2B: 12" Tray; Bare #8 Min, Avg & Max



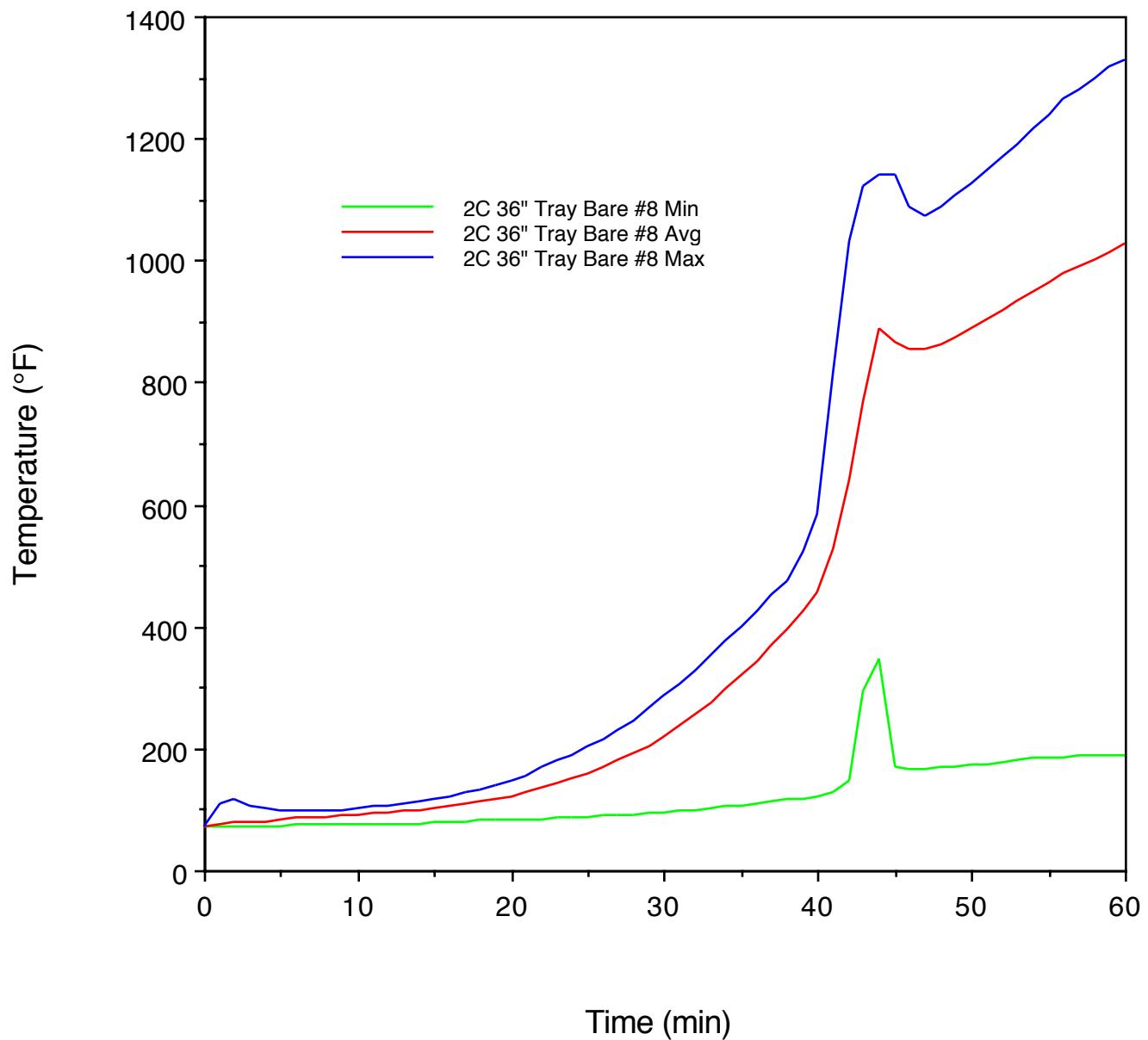
Project No. 14790-123264
Sandia National Laboratories
Item 2B: 12" Tray; Left Rail Min, Avg & Max



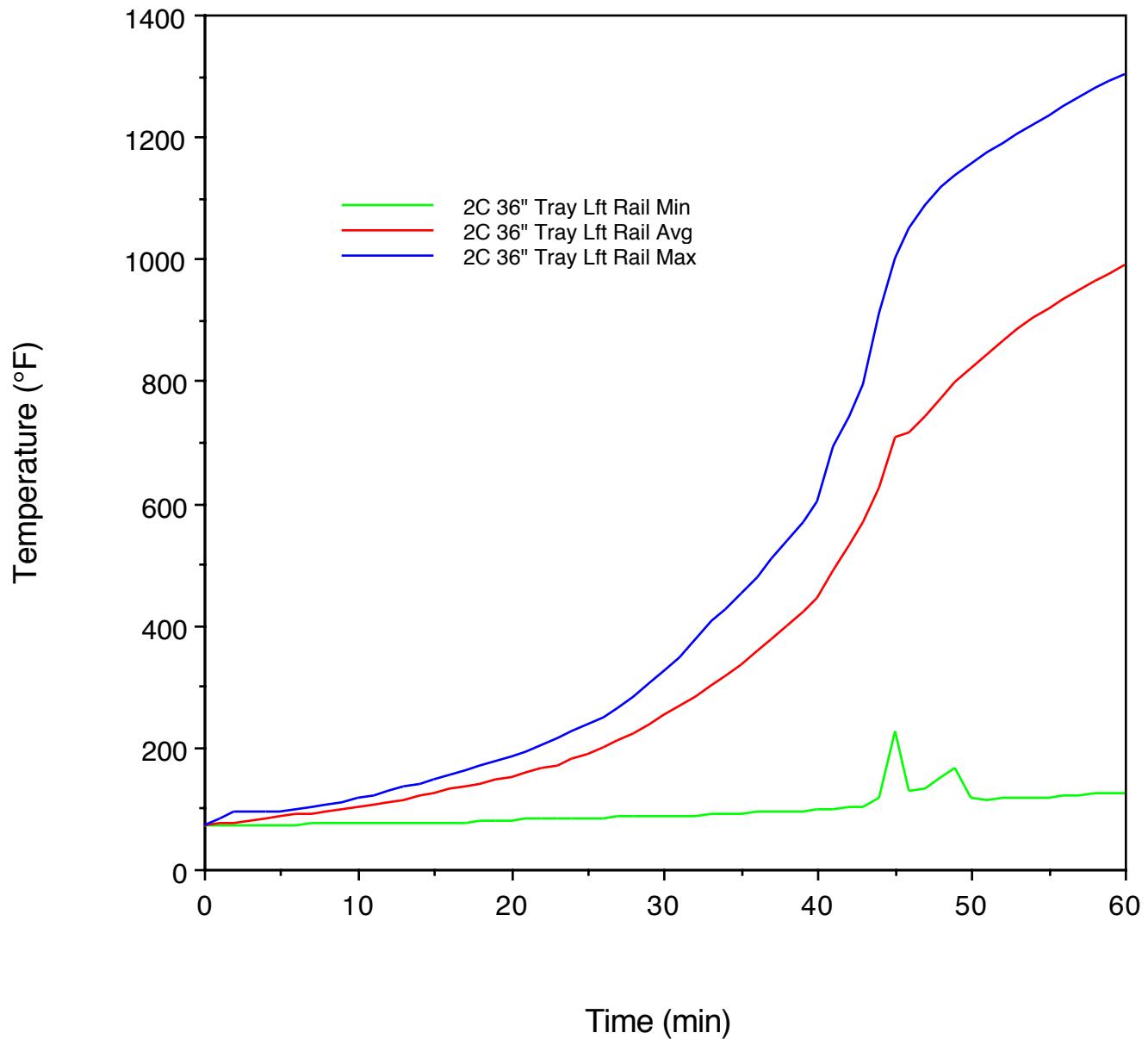
Project No. 14790-123264
Sandia National Laboratories
Item 2C: 36" Tray; Right Rail Min, Avg & Max



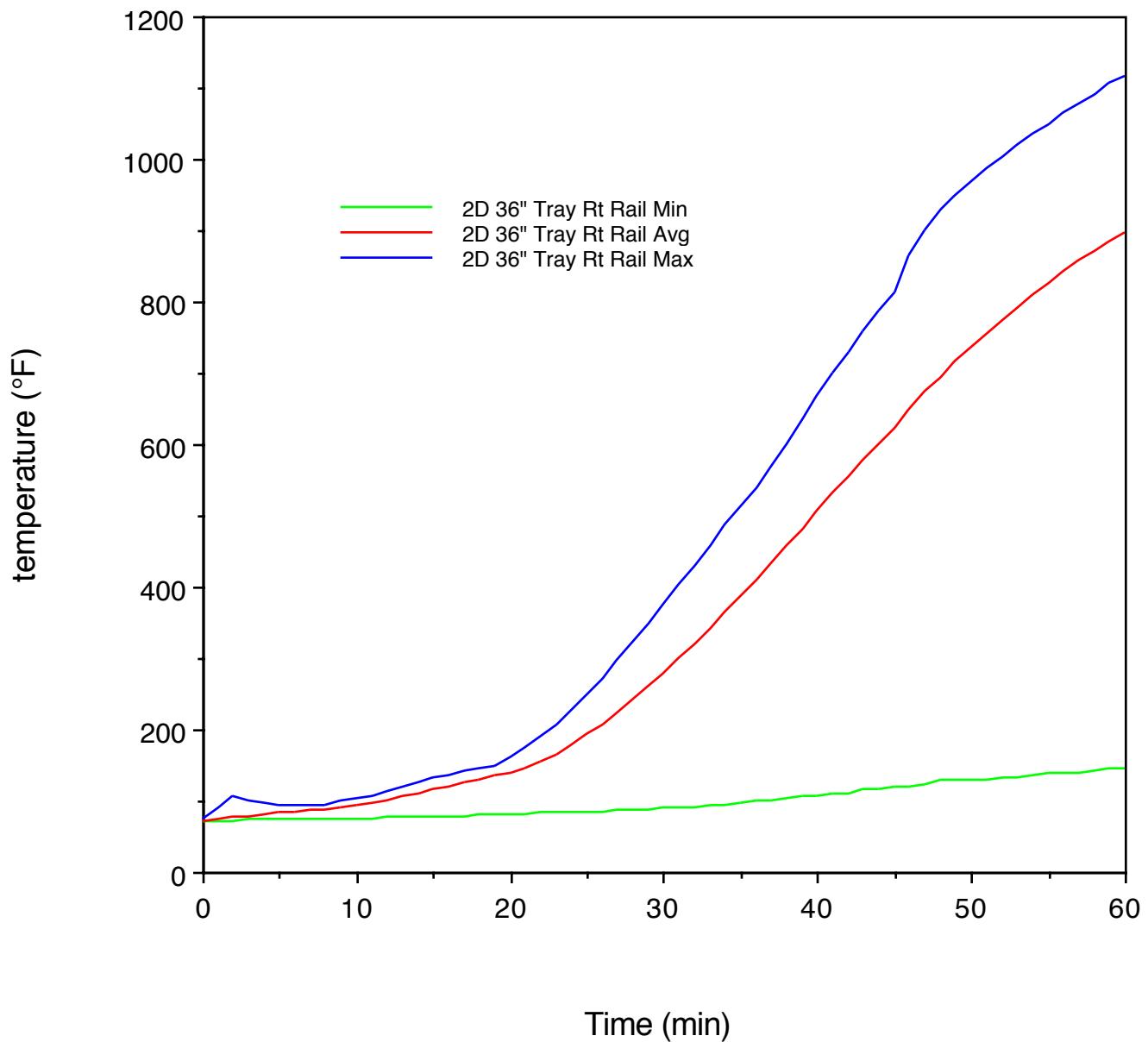
Project No. 14790-123264
Sandia National Laboratories
Item 2C: 36" Tray; Bare #8 Min, Avg & Max



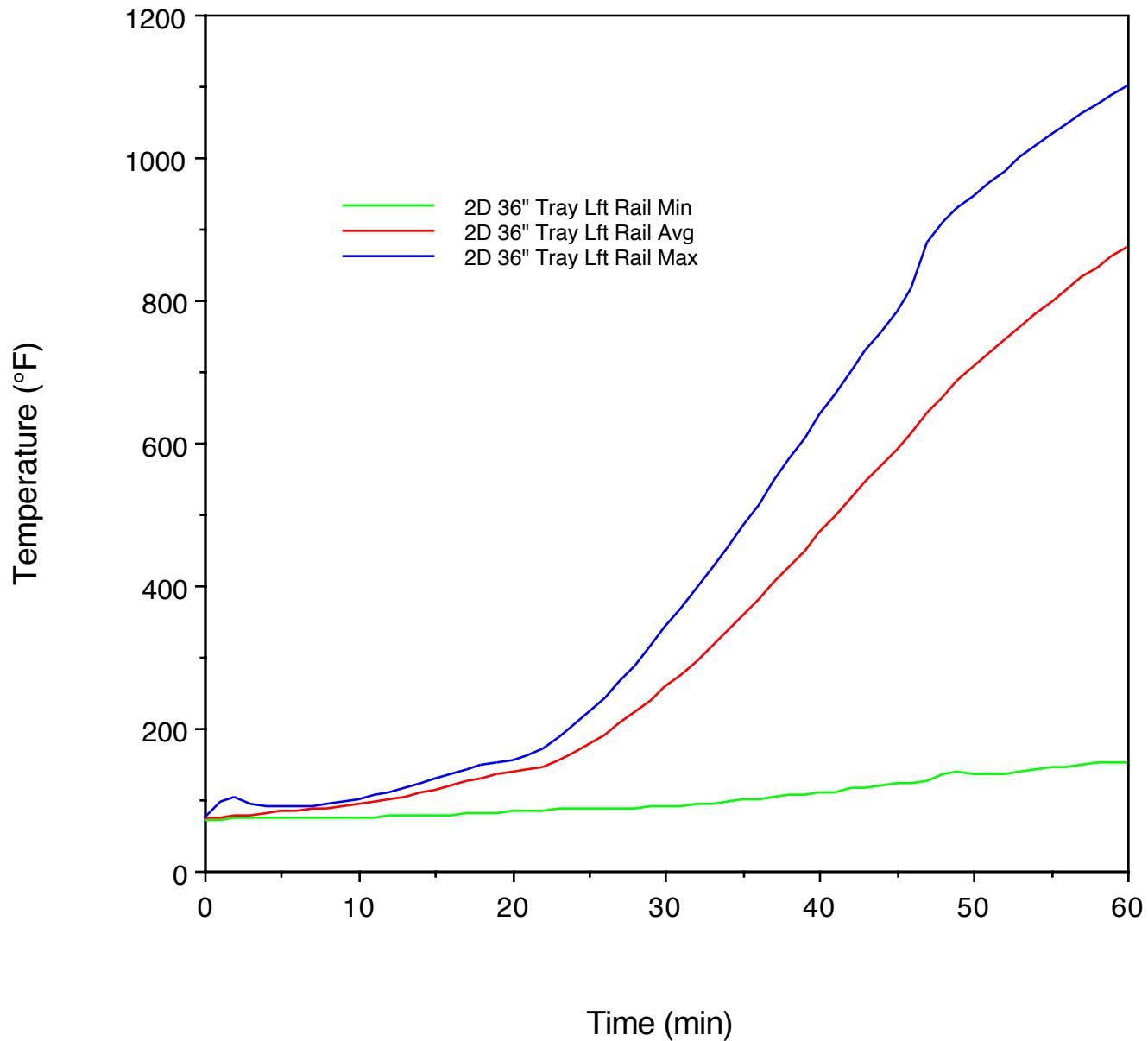
Project No. 14790-123264
Sandia National Laboratories
Item 2C: 36" Tray; Left Rail Min, Avg & Max



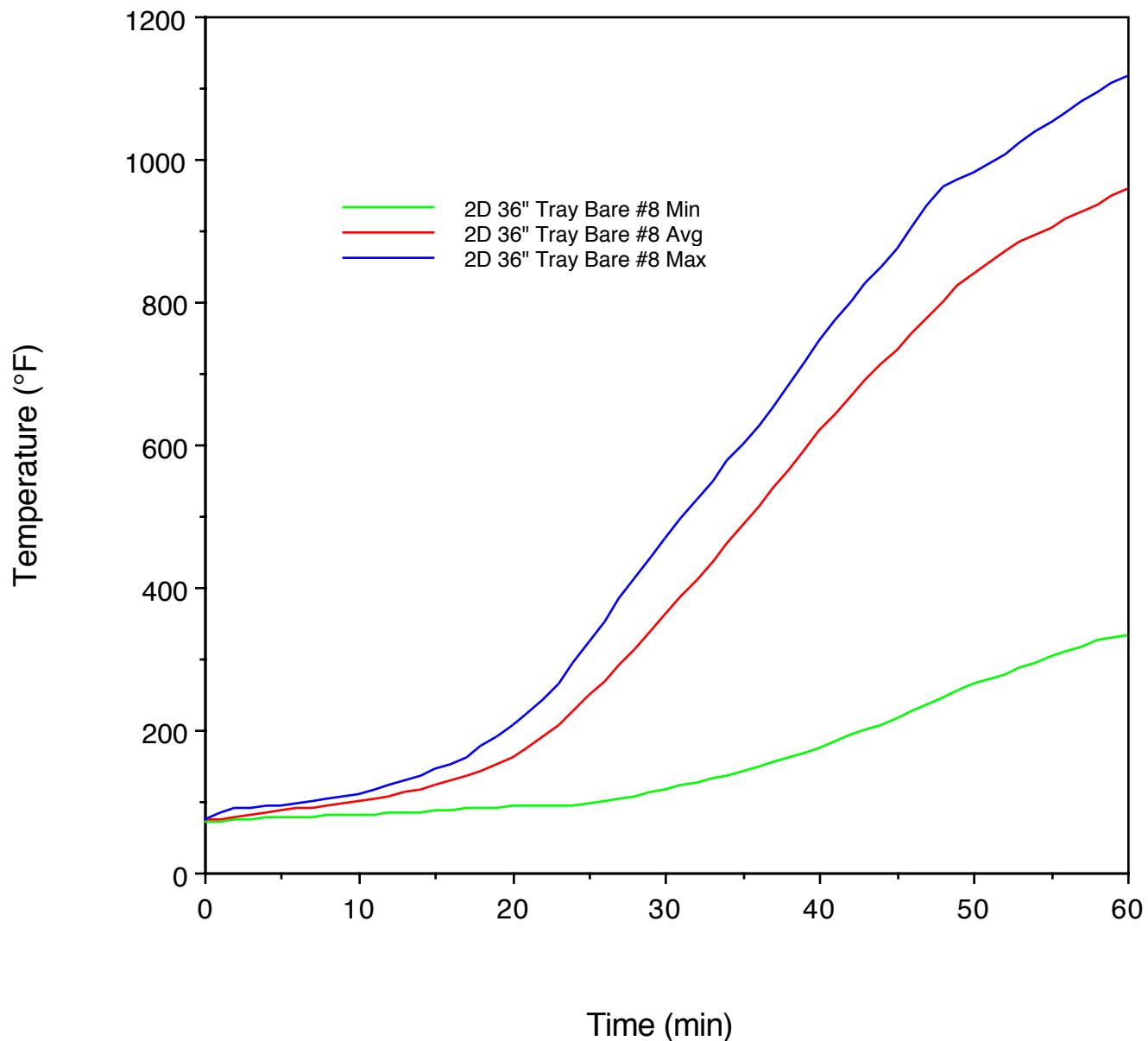
Project No. 14790-123264
Sandia National Laboratories
Item 2D: 36" Tray; Right Rail Min, Avg & Max



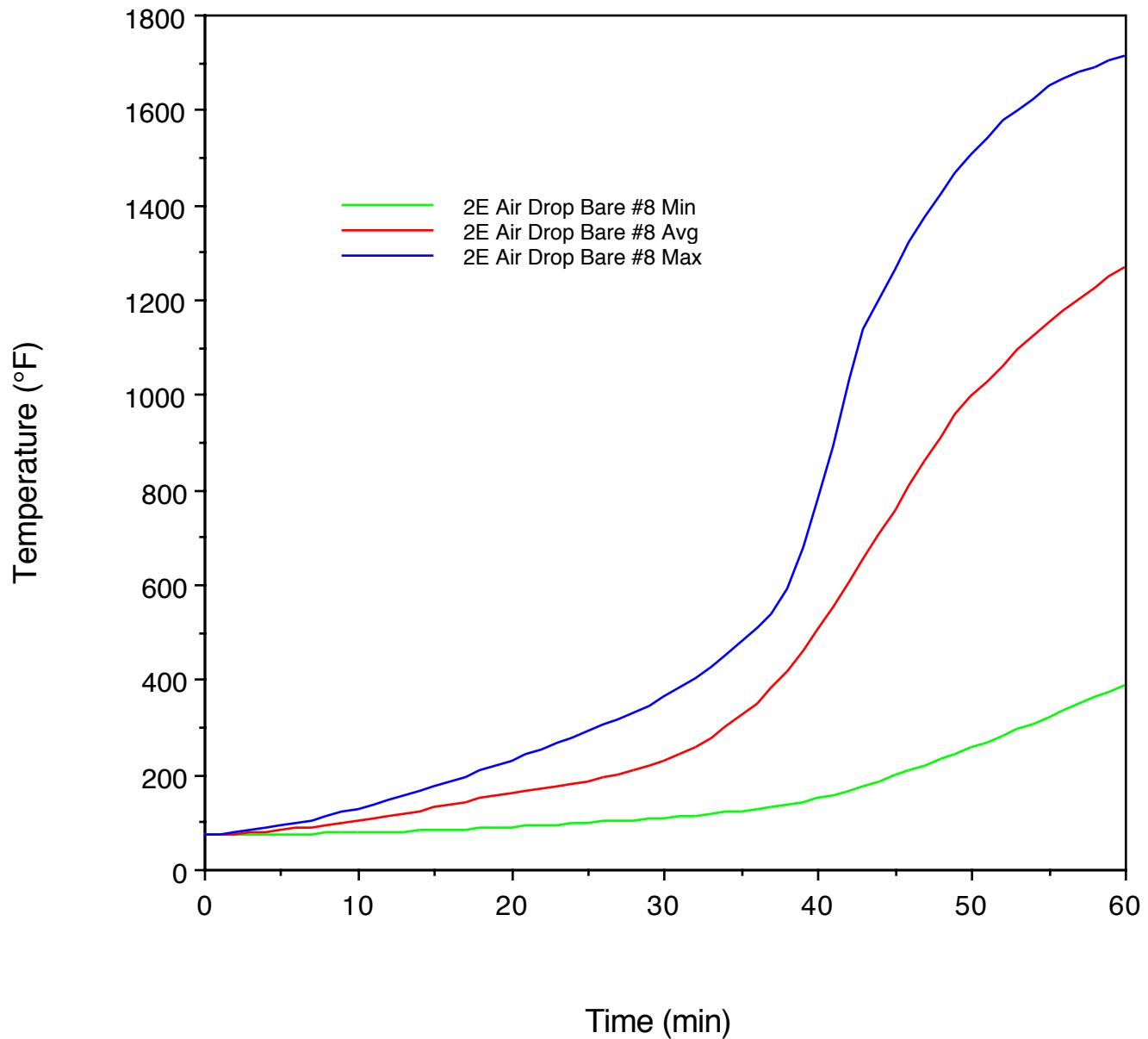
Project No. 14790-123264
Sandia National Laboratories
Item 2D: 36" Tray; Left Rail Min, Avg & Max



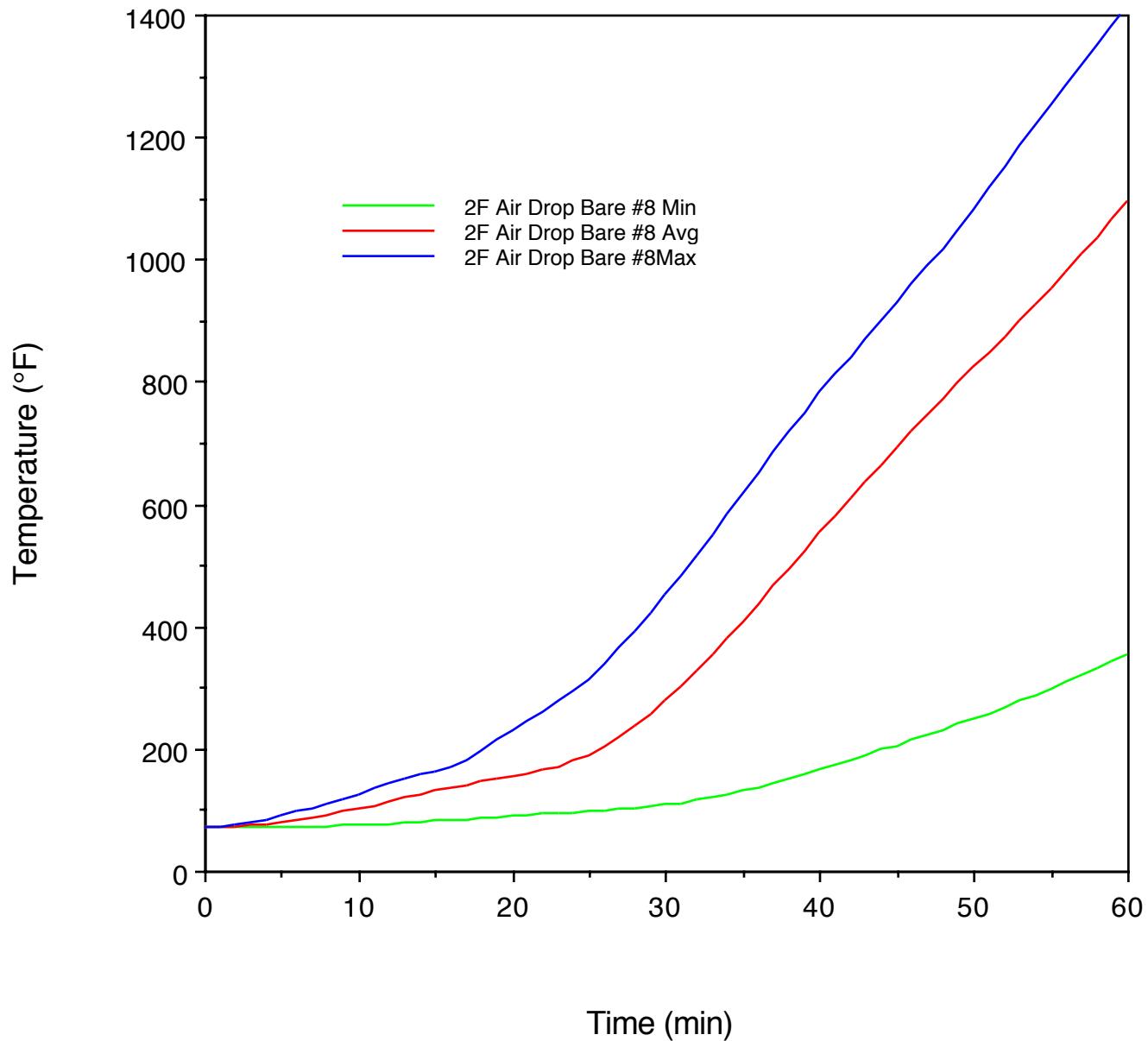
Project No. 14790-123264
Sandia National Laboratories
Item 2D: 36" Tray; Bare #8 Min, Avg & Max



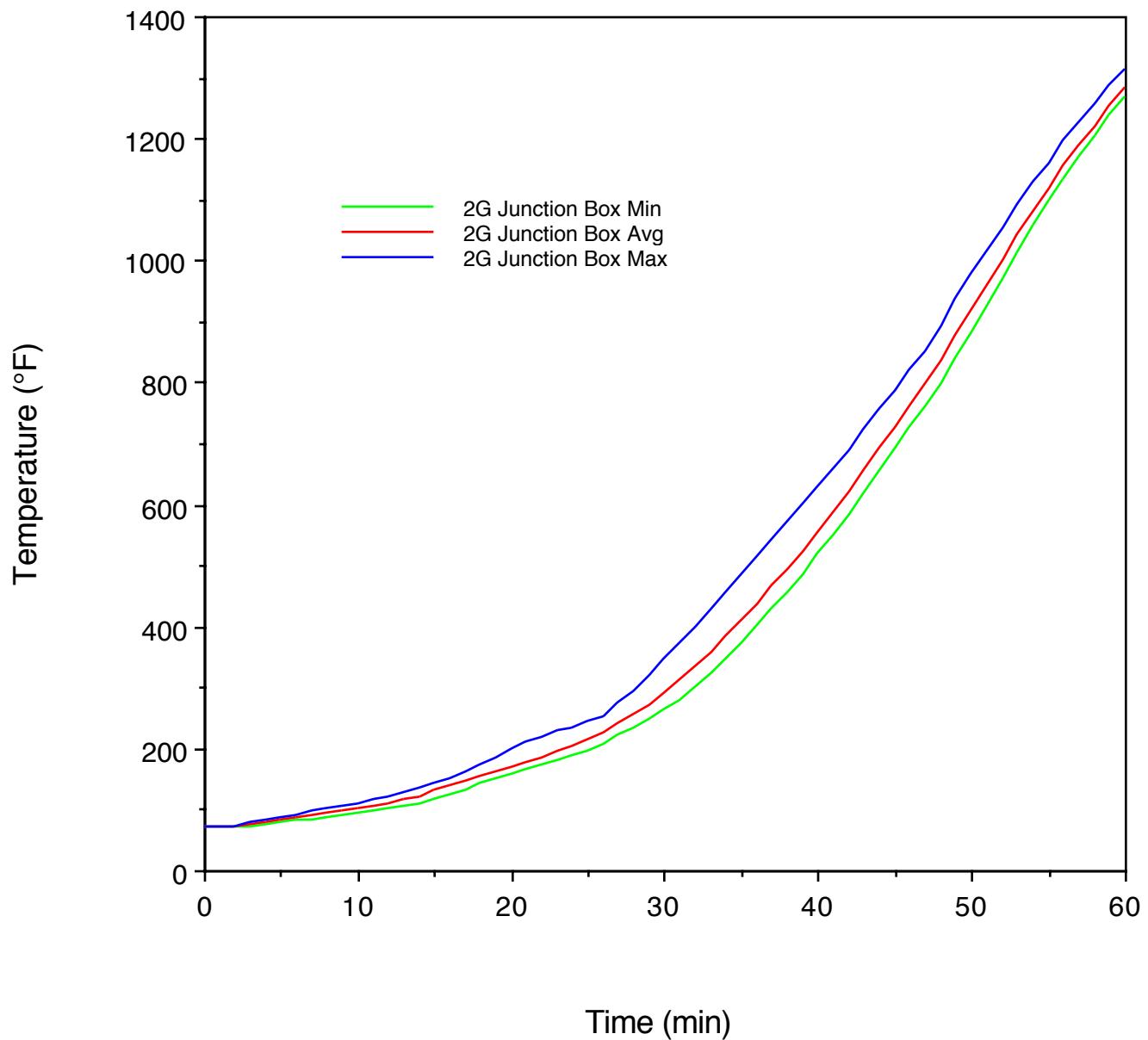
Project No. 14790-123264
Sandia National Laboratories
Item 2E: Air Drop; Bare #8 Min, Avg & Max



Project No. 14790-123264
Sandia National Laboratories
Item 2F: Air Drop; Bare #8 Min, Avg & Max

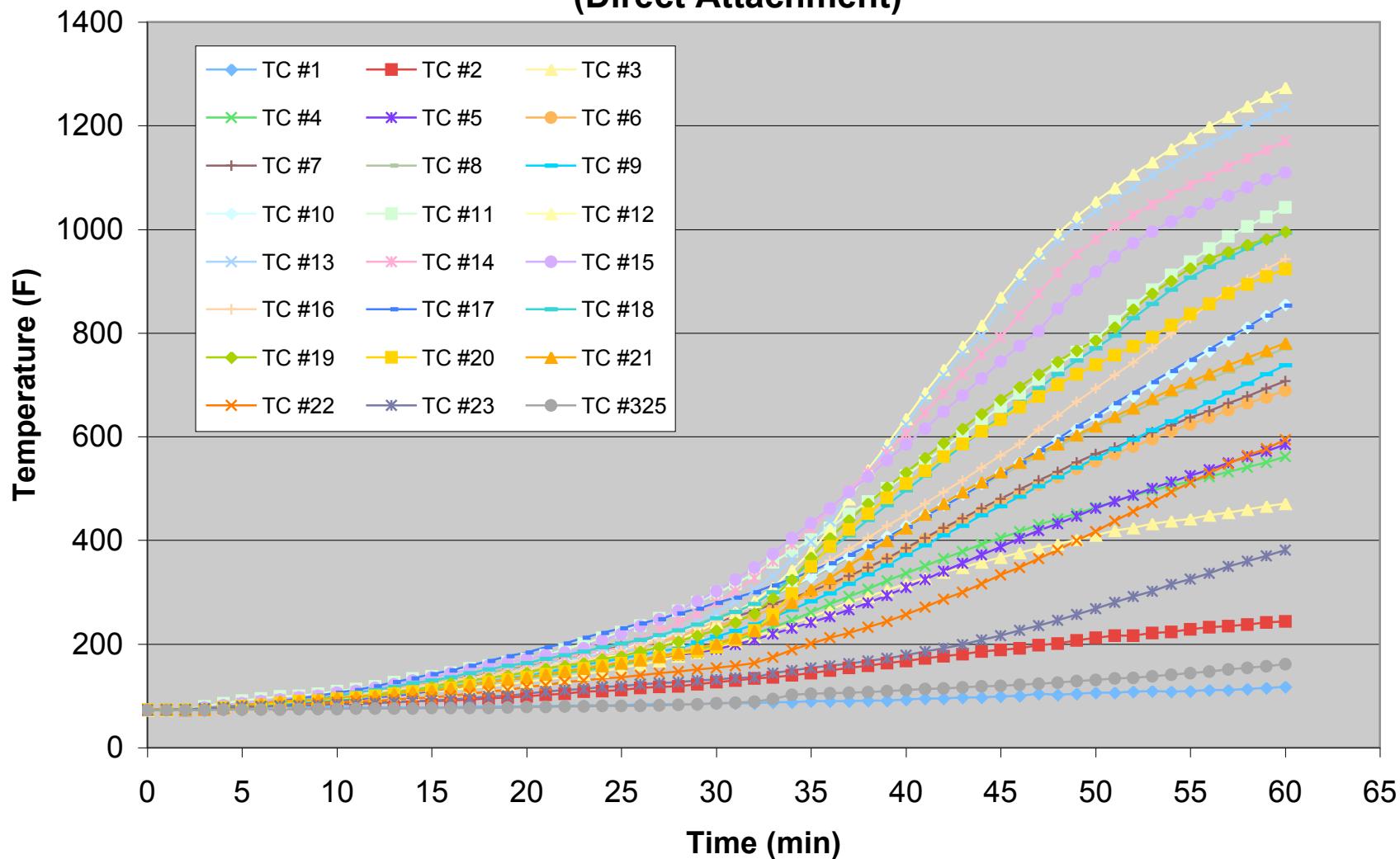


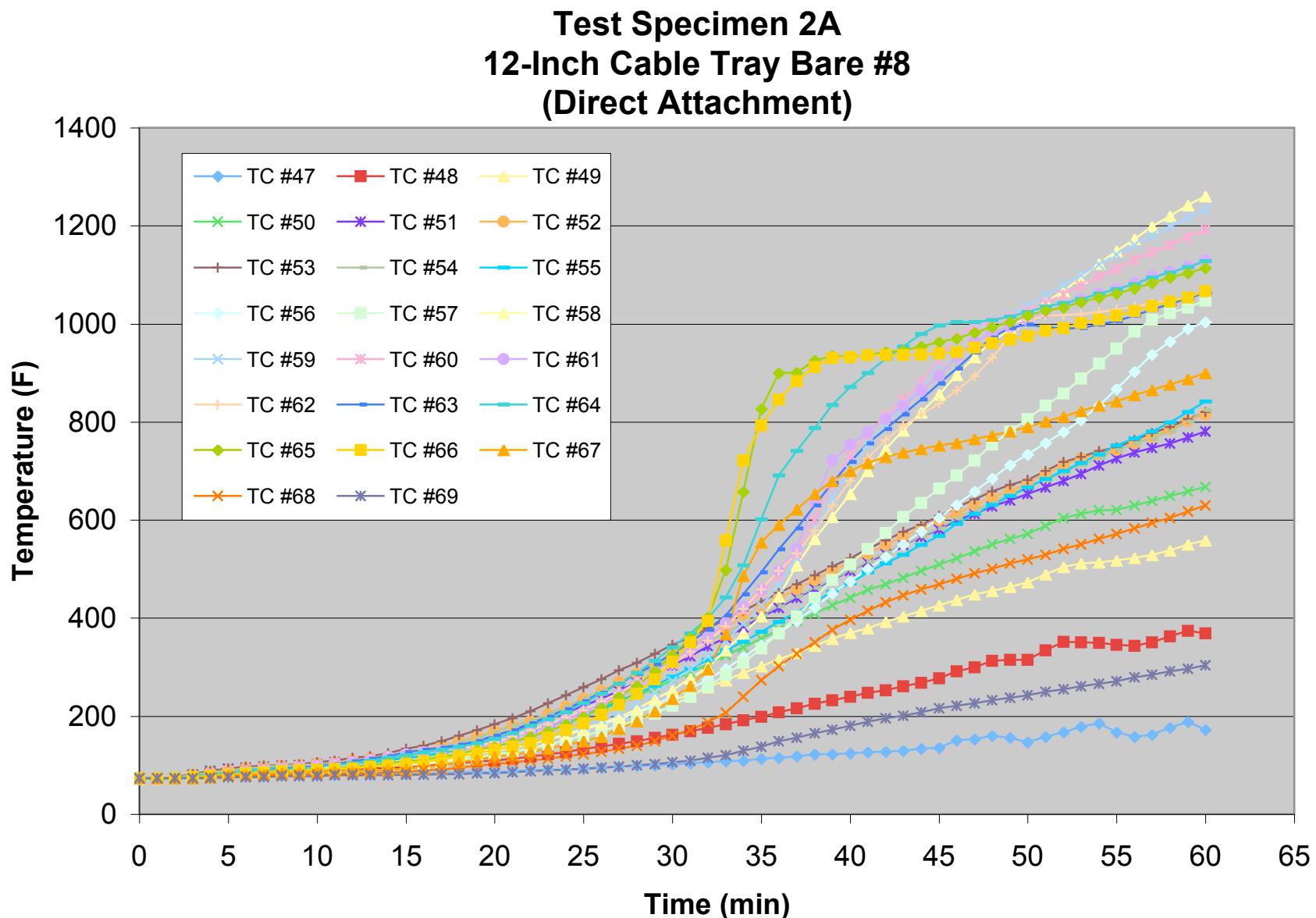
Project No. 14790-123264
Sandia National Laboratories
Item 2G: Junction box Min, Avg & Max



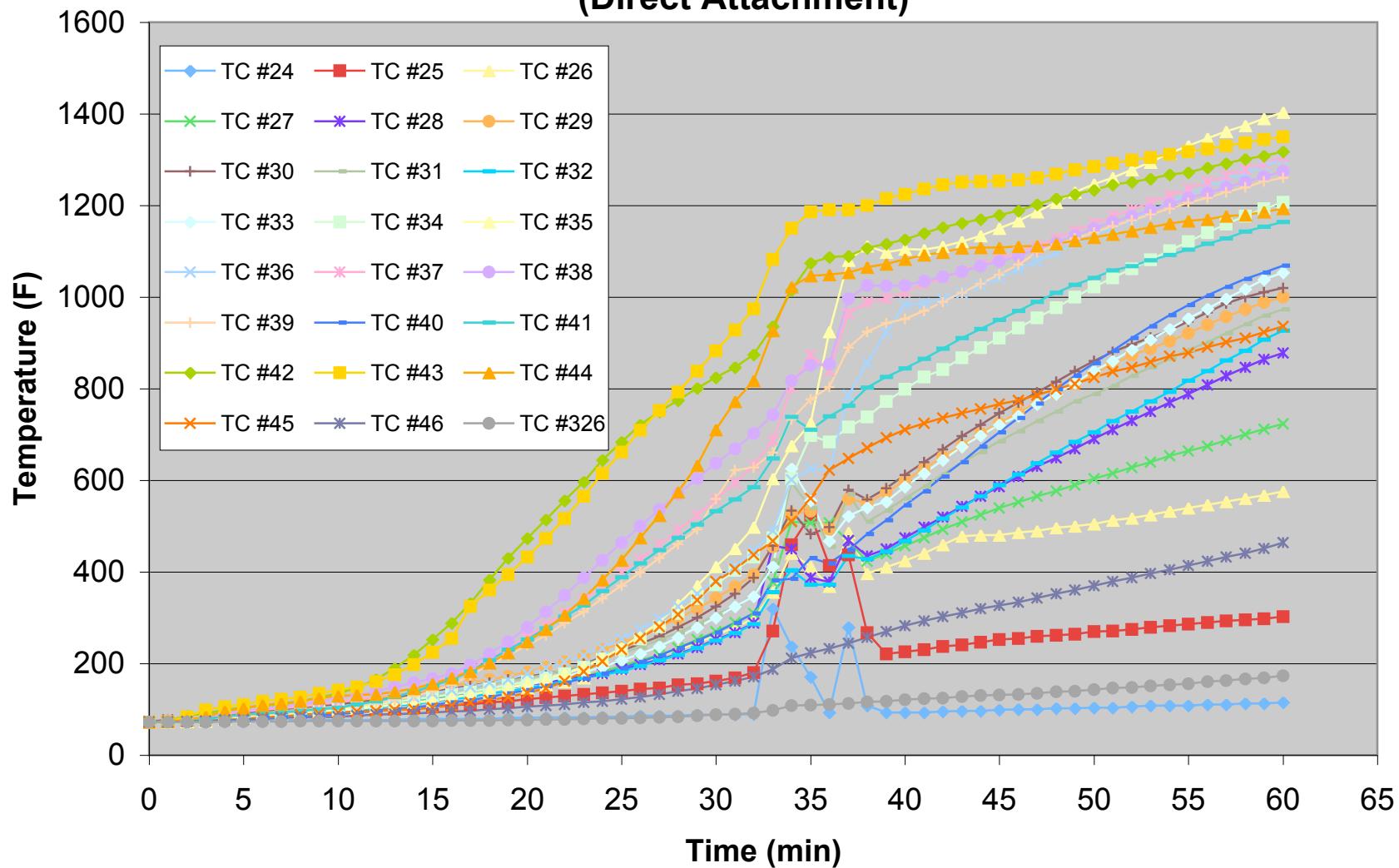
Test Specimen 2A

12-Inch Cable Tray Right Rail (Direct Attachment)



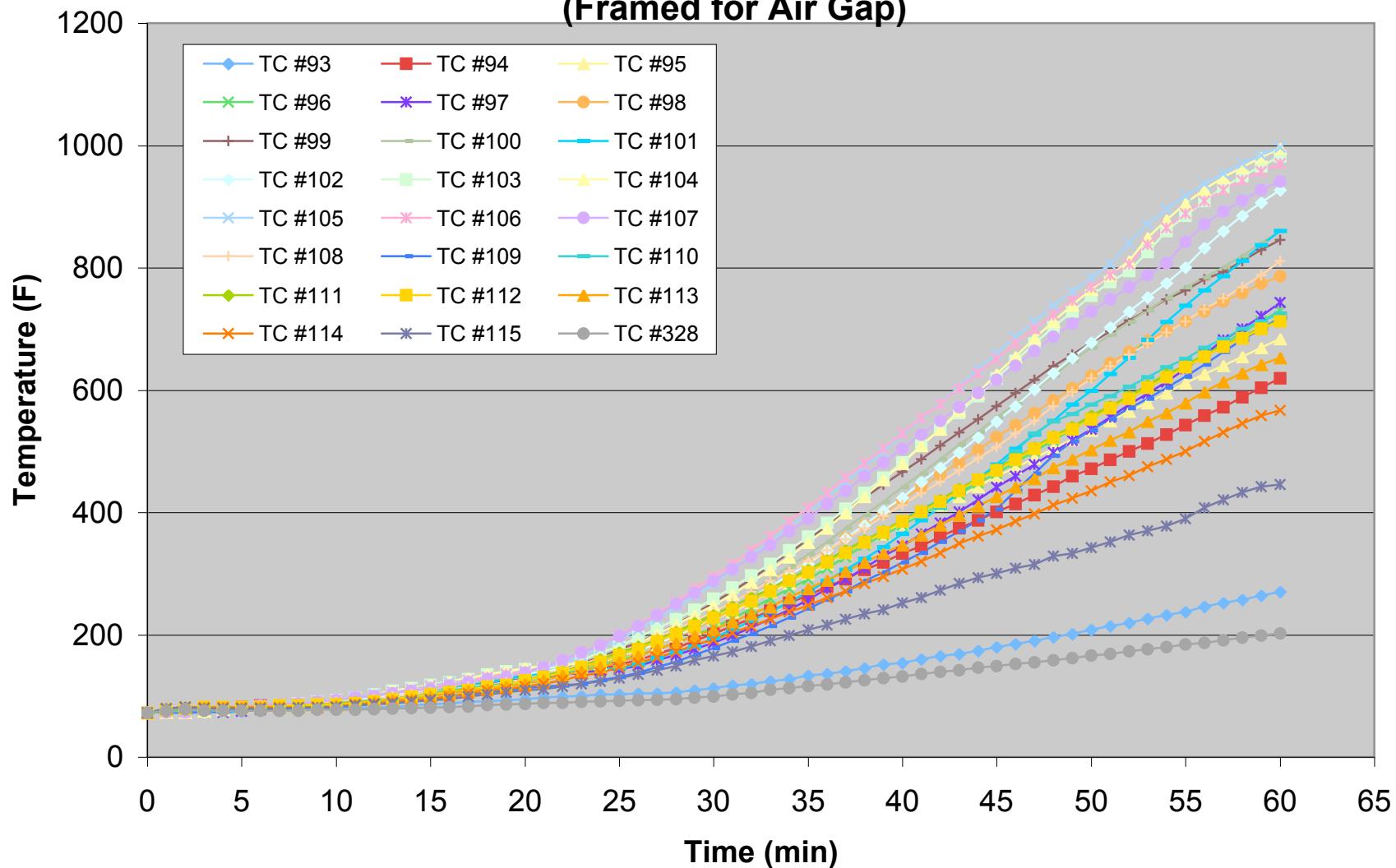


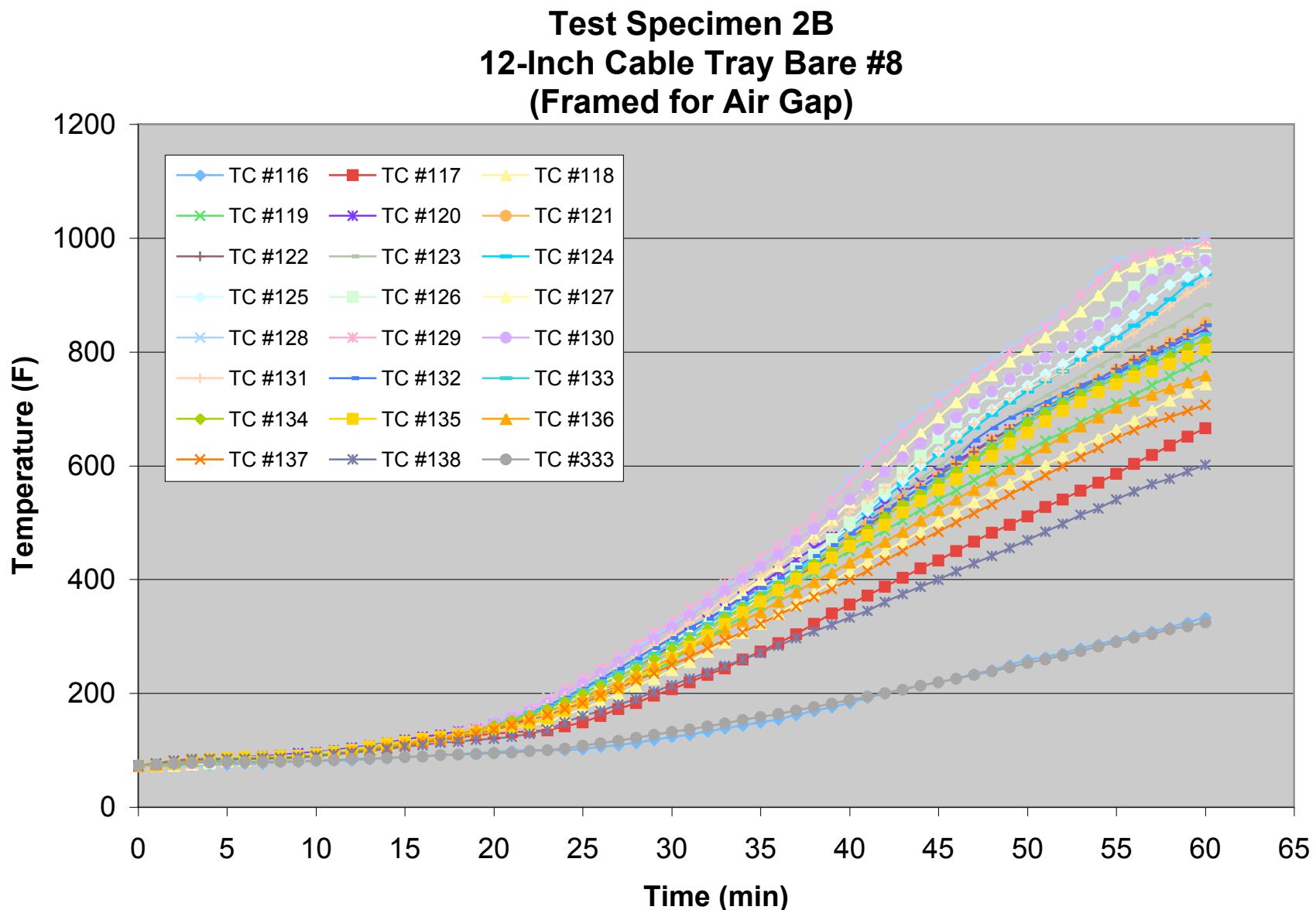
Test Specimen 2A
12-Inch Cable Tray Left Rail
(Direct Attachment)

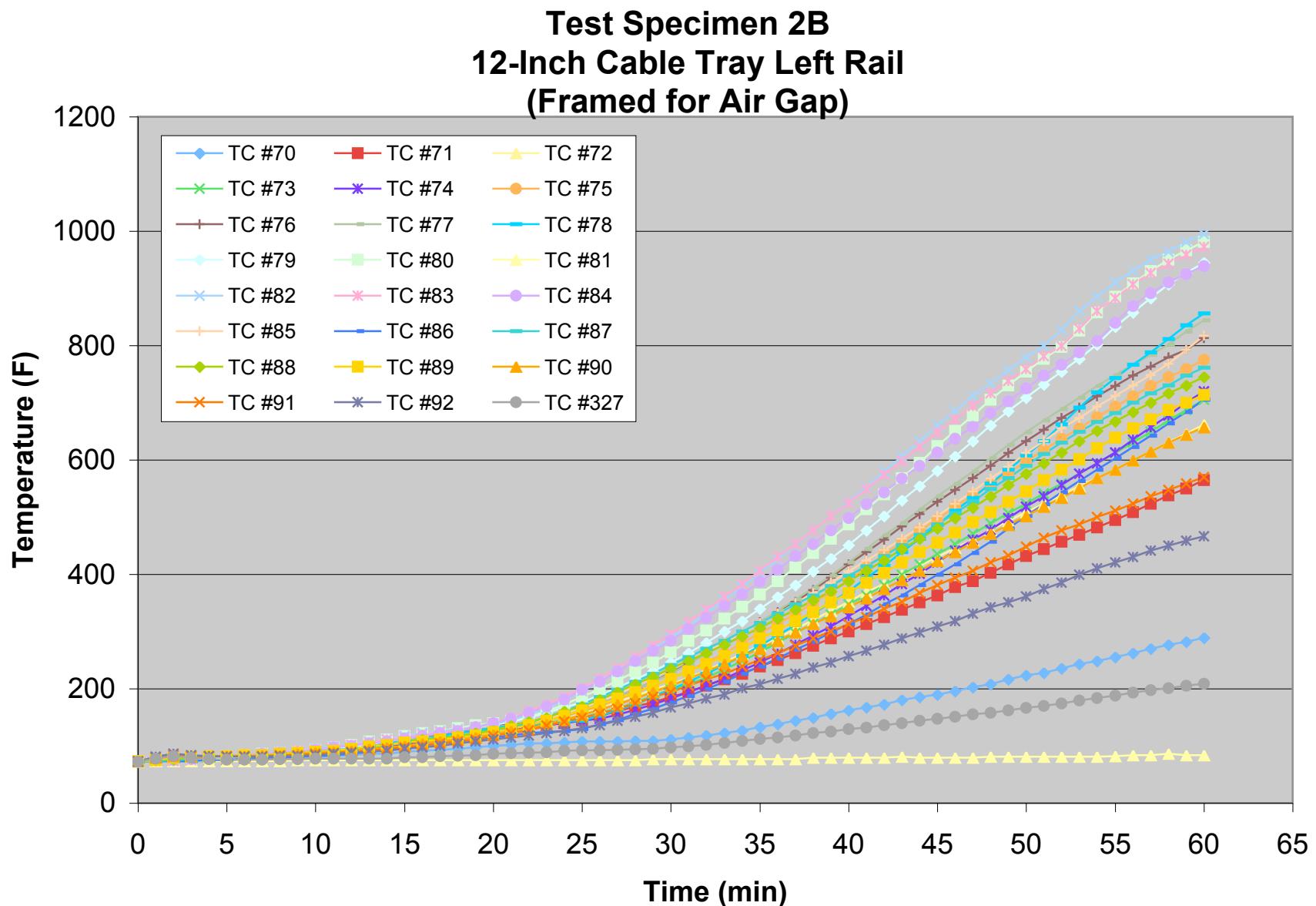


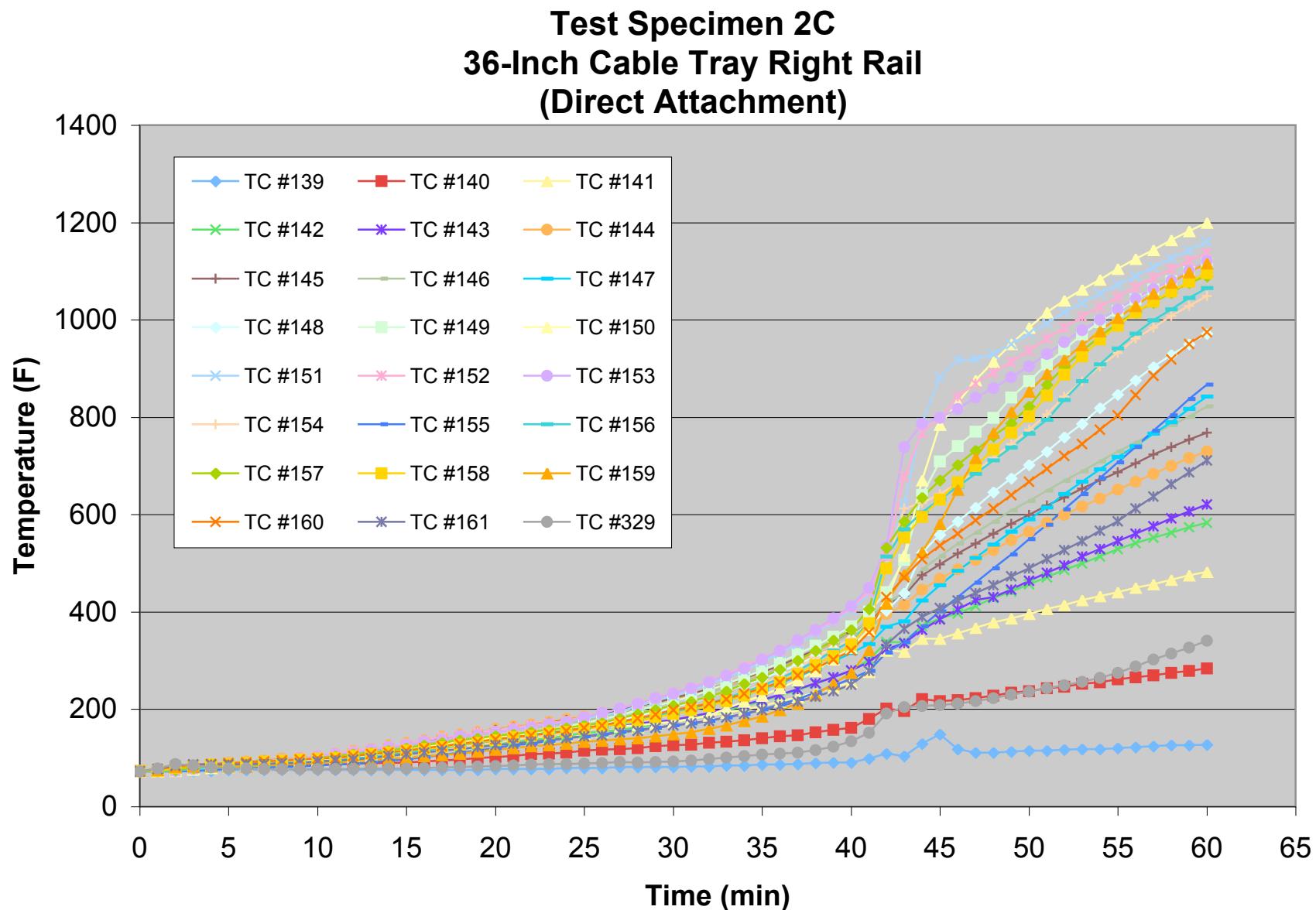
Test Specimen 2B

12-Inch Cable Tray Right Rail (Framed for Air Gap)



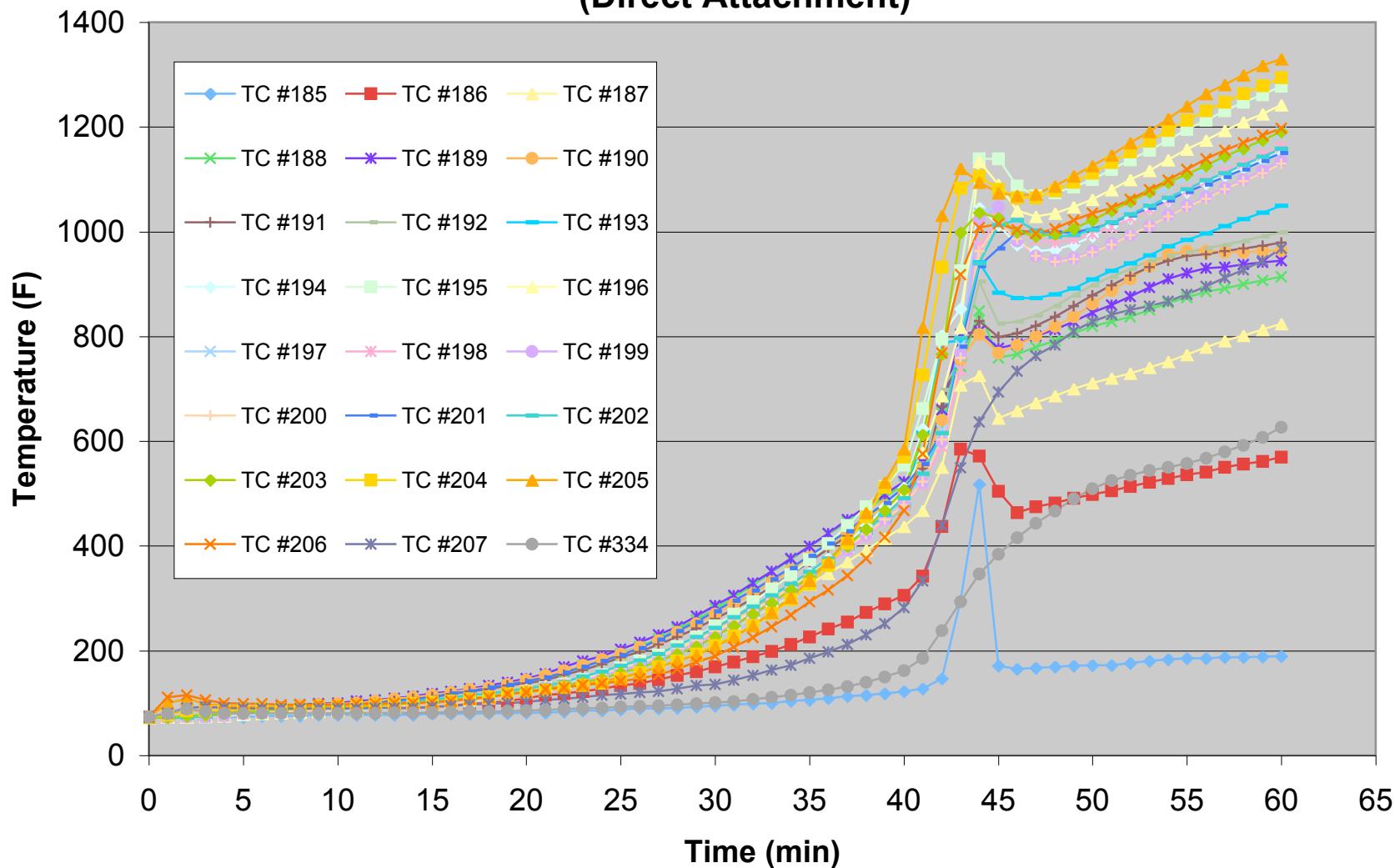




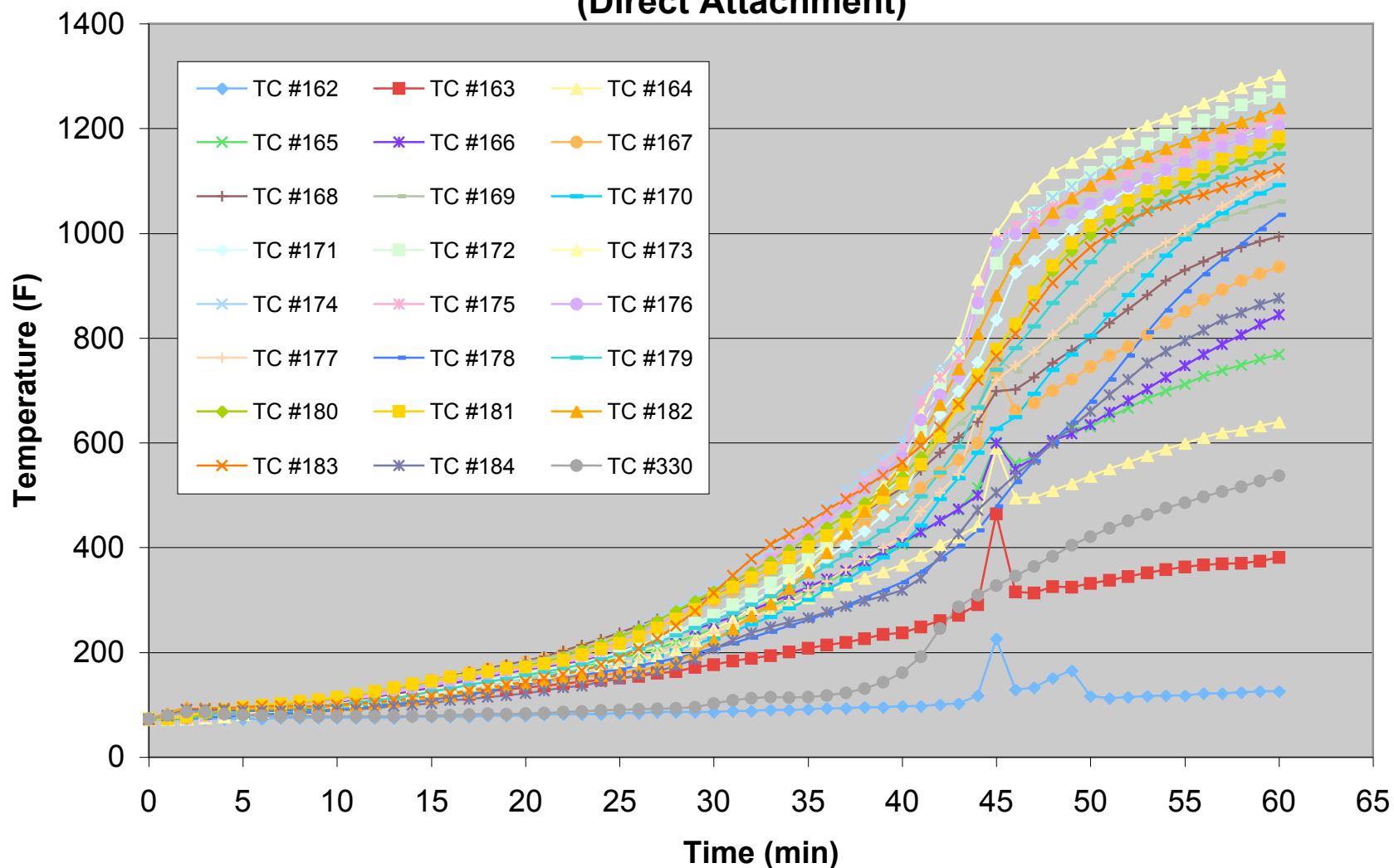


Test Specimen 2C

36-Inch Cable Tray Bare #8 (Direct Attachment)

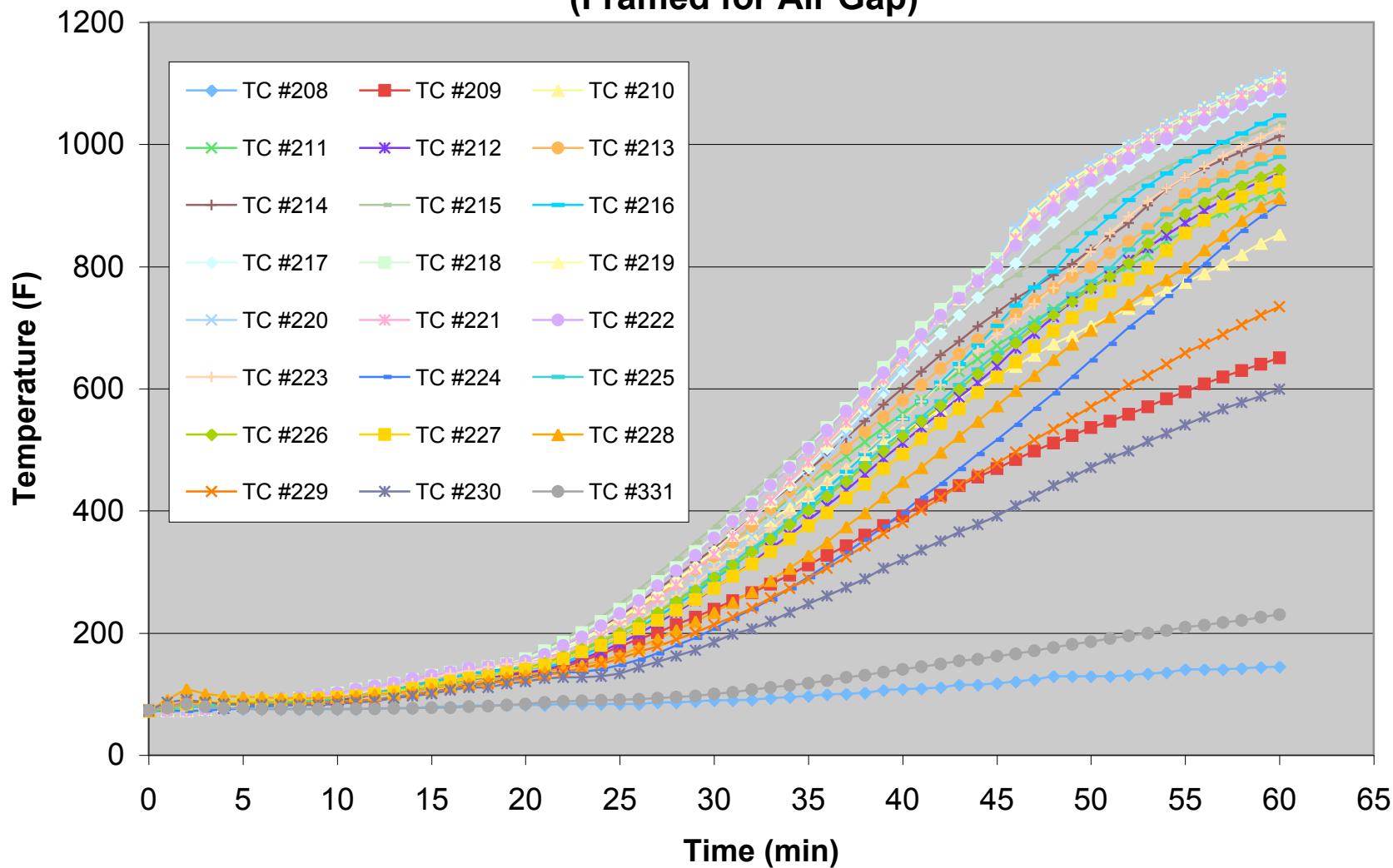


Test Specimen 2C
36-Inch Cable Tray Left Rail
(Direct Attachment)



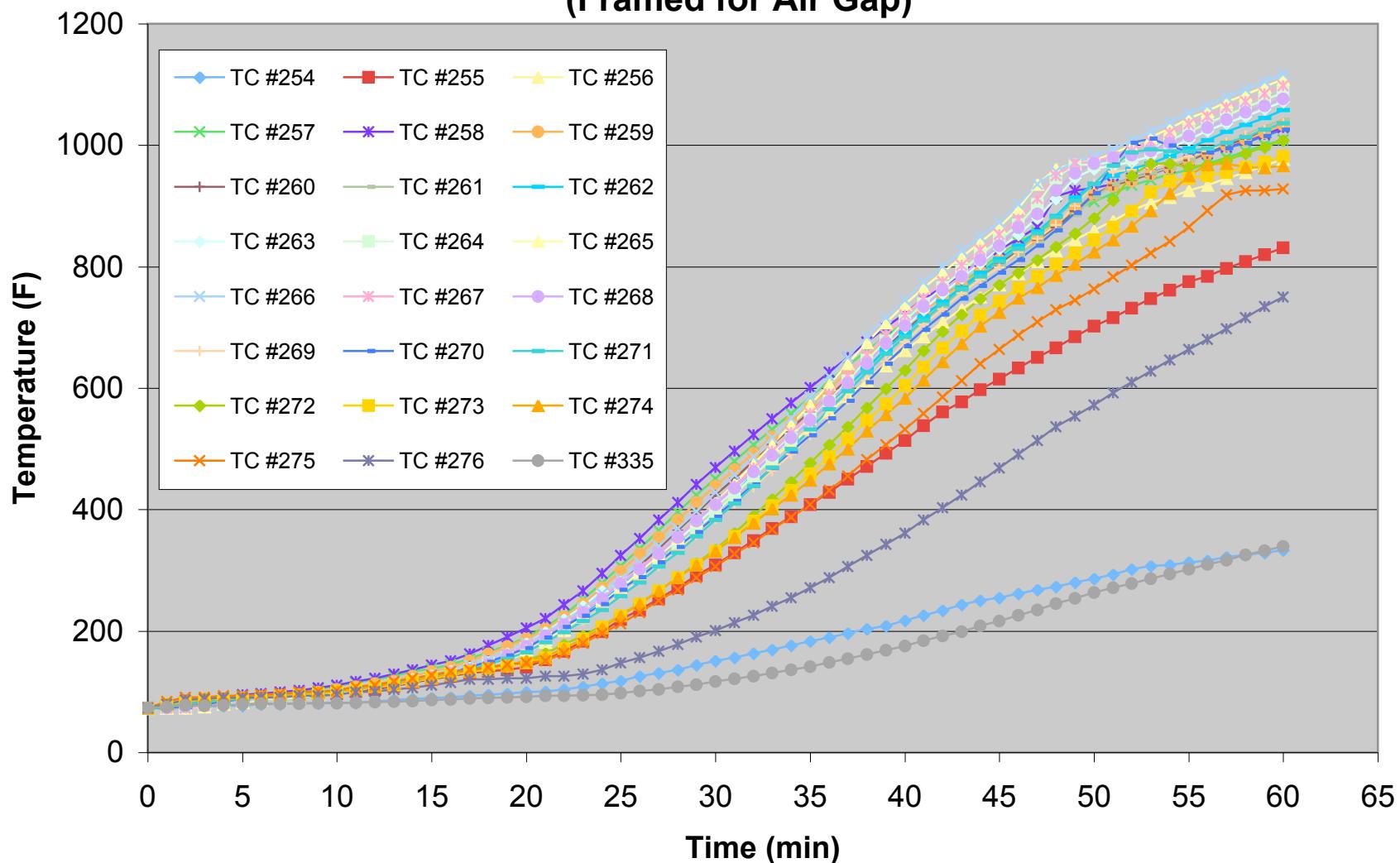
Test Specimen 2D

36-Inch Cable Tray Right Rail (Framed for Air Gap)



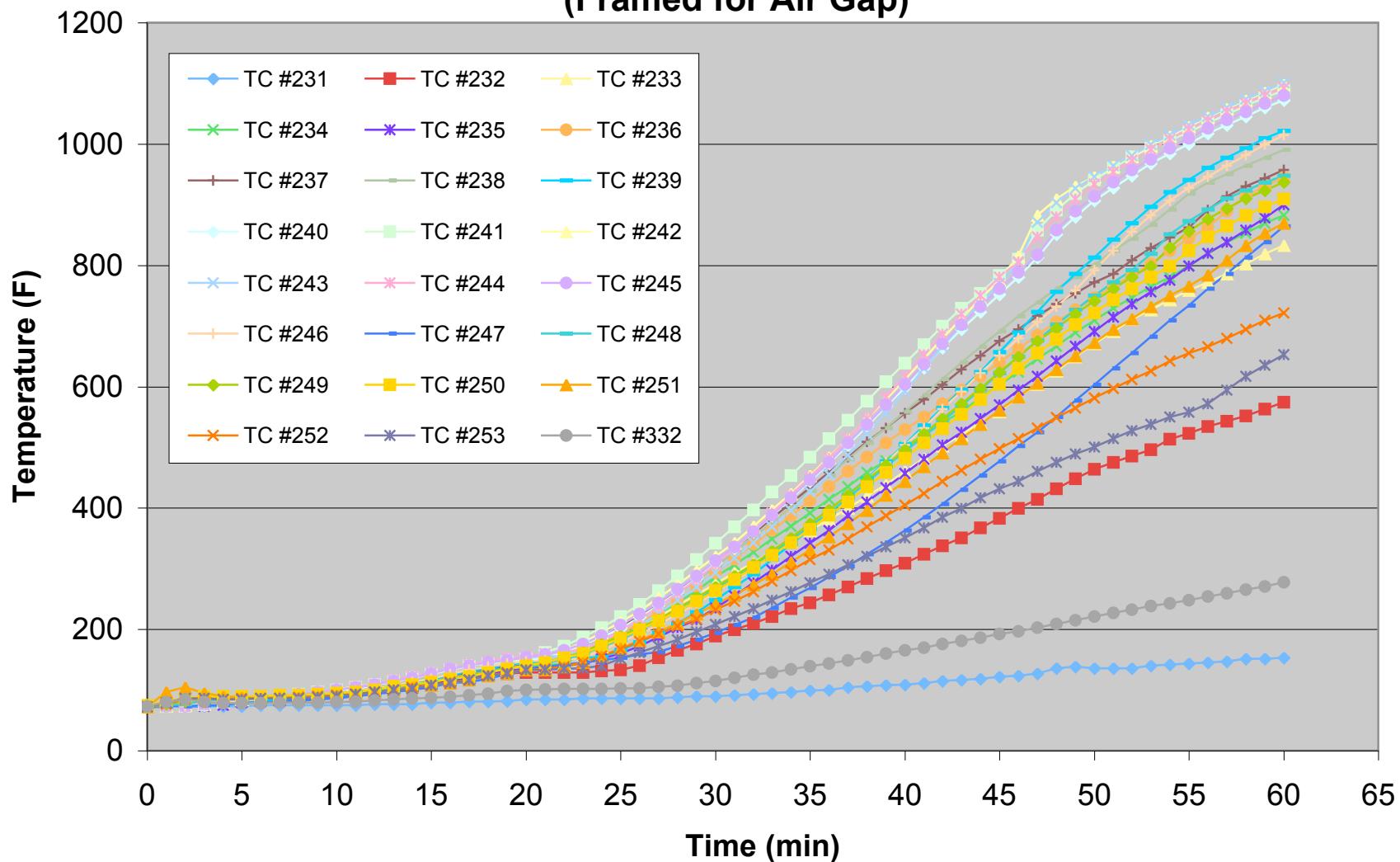
Test Specimen 2D

36-Inch Cable Tray Bare #8 (Framed for Air Gap)



Test Specimen 2D

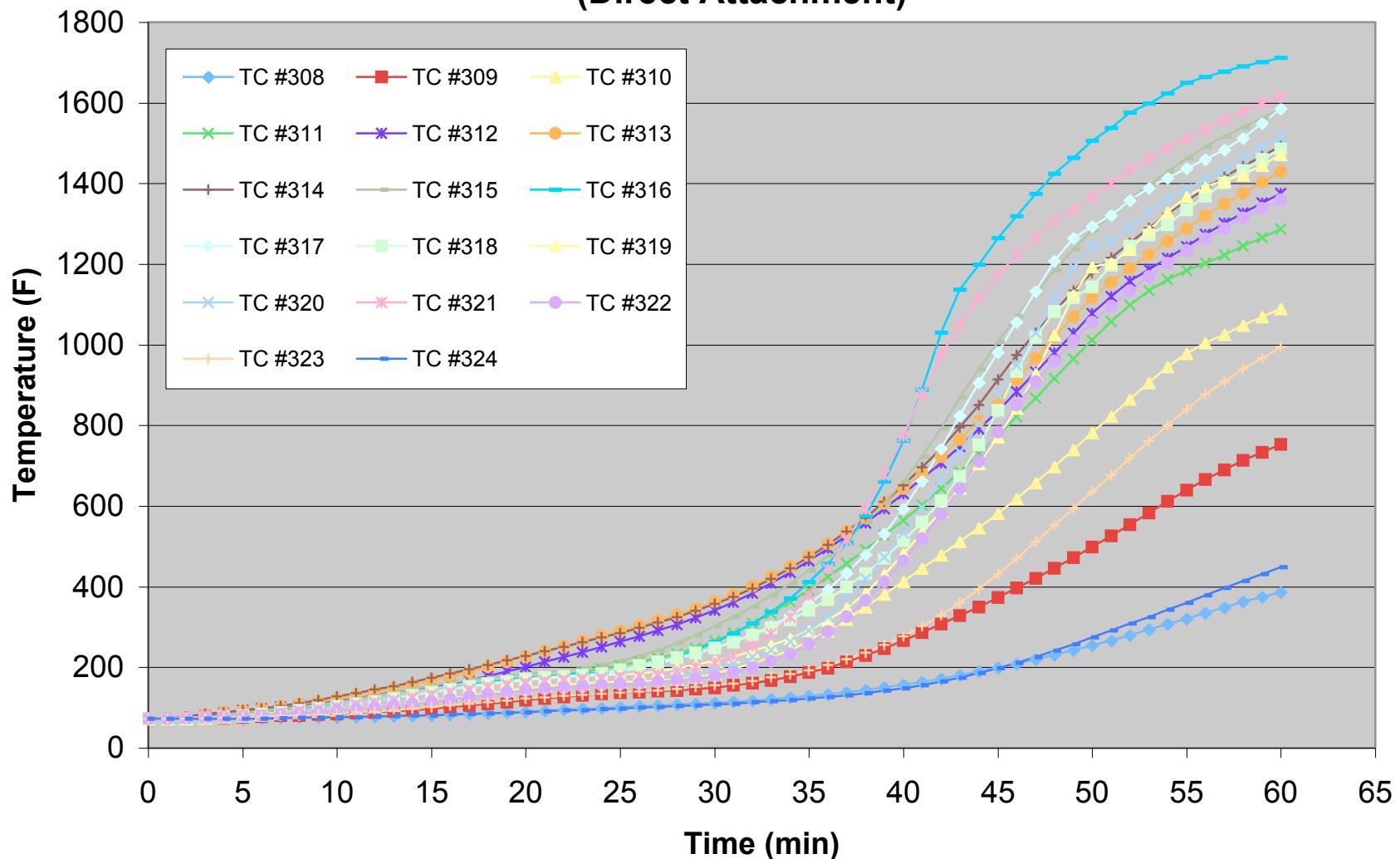
36-Inch Cable Tray Left Rail (Framed for Air Gap)



Test Specimen 2E

Cable Drop Bare #8

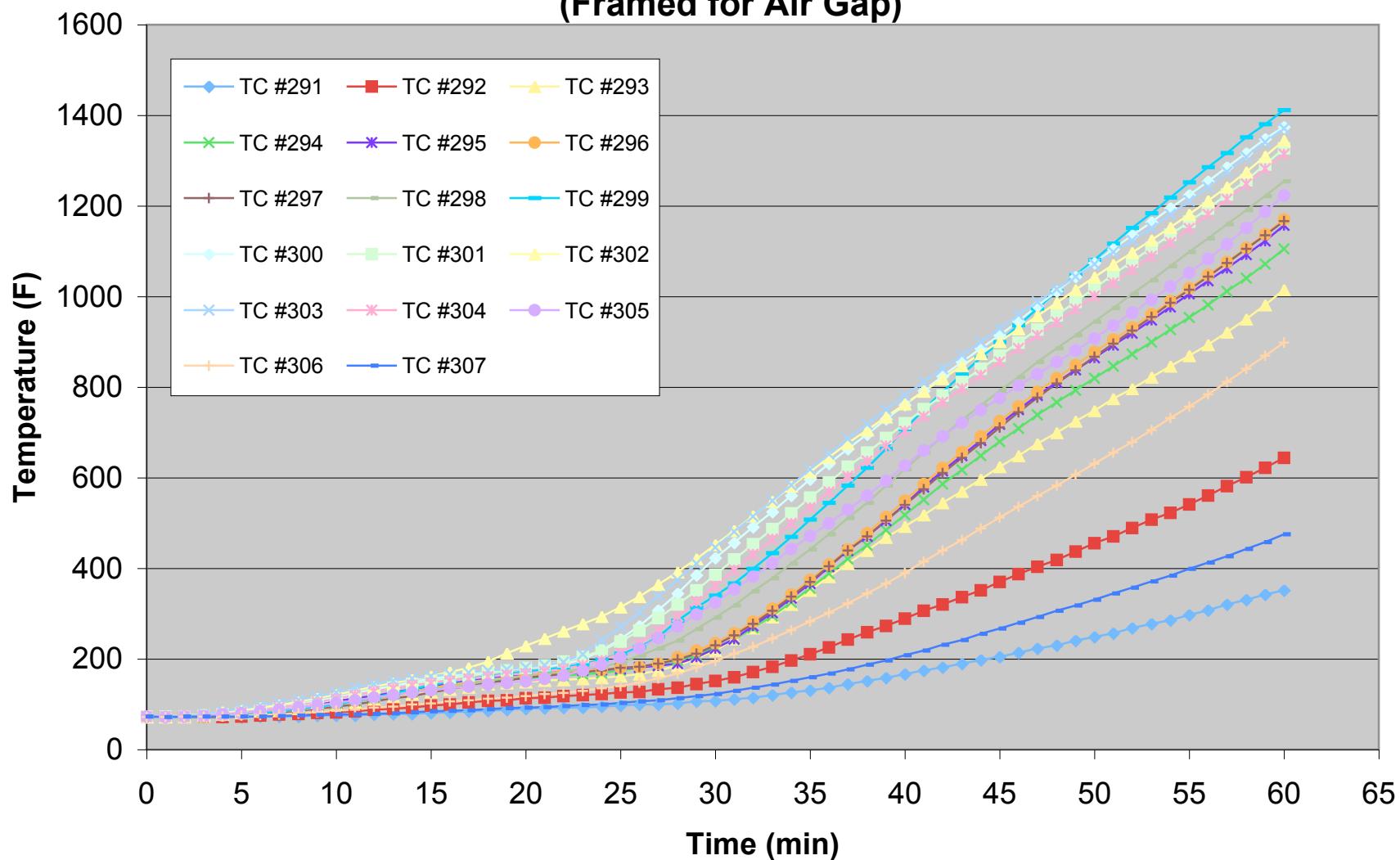
(Direct Attachment)

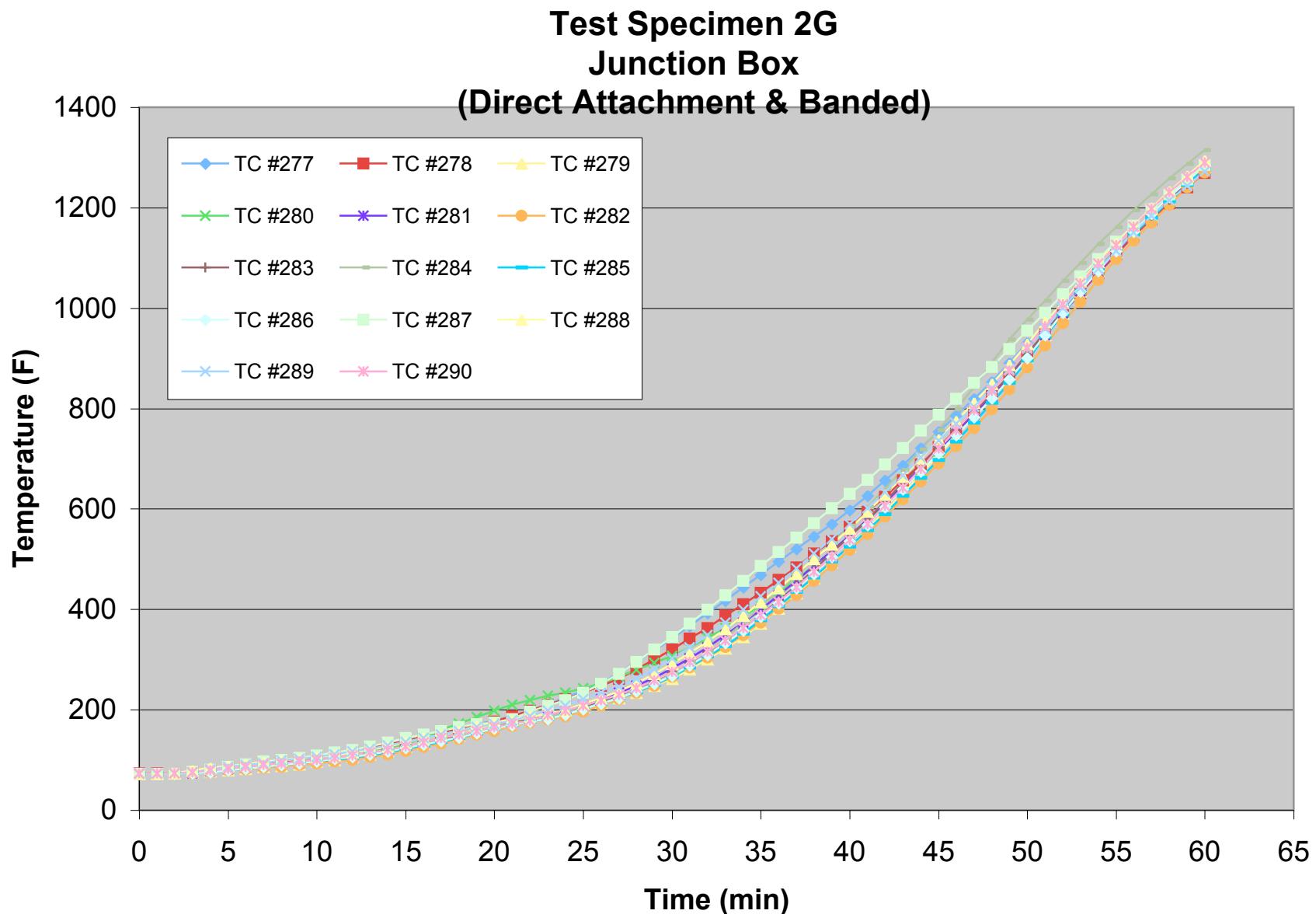


Test Specimen 2F

Cable Drop Bare #8

(Framed for Air Gap)





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	Item 2A 12" Tray Right Rail	Item 2A 12" Tray Right Rail	Item 2A 12" Tray Right Rail	Item 2A 12" Tray Bare #8	Item 2A 12" Tray Bare #8	Item 2A 12" Tray Bare #8	Item 2A 12" Tray Left Rail	Item 2A 12" Tray Left Rail	Item 2A 12" Tray Left Rail
Time (min)	Min (°F)	Avg (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)
0	72	72	73	72	72	73	72	72	73
1	72	72	73	72	73	77	72	73	77
2	72	73	73	72	73	75	72	75	86
3	72	75	79	73	76	82	72	79	99
4	73	78	86	73	81	90	73	84	106
5	73	81	91	75	84	93	73	88	111
6	73	84	95	75	87	97	73	91	118
7	73	87	99	75	89	99	73	94	122
8	74	90	100	77	91	100	74	97	127
9	74	92	104	77	93	102	74	100	135
10	74	96	109	77	95	106	74	104	142
11	75	99	113	79	97	109	75	108	149
12	75	102	118	79	100	115	75	113	165
13	75	106	126	79	102	118	75	119	190
14	75	110	133	79	106	124	75	126	219
15	76	114	142	81	109	133	75	134	252
16	76	119	149	81	113	140	76	143	288
17	76	125	158	82	118	149	76	155	331
18	76	130	167	82	123	160	76	167	383
19	77	135	176	84	129	171	77	179	430
20	78	140	183	84	136	183	77	192	473
21	78	146	194	86	144	196	78	206	514
22	79	152	201	88	153	210	78	221	556
23	79	157	212	90	163	226	79	238	597
24	80	163	221	91	174	243	80	257	644
25	81	169	230	93	186	259	80	275	684
26	81	177	239	95	199	275	81	296	721
27	82	185	250	97	212	293	83	316	752
28	83	194	264	99	228	309	84	338	793
29	84	203	282	100	245	327	86	361	838
30	86	214	302	102	263	345	88	388	883
31	86	225	324	104	283	369	88	414	928
32	86	238	347	106	304	401	90	439	975
33	88	256	374	108	337	558	98	511	1083
34	88	275	405	109	378	721	108	590	1150
35	90	295	433	113	416	826	109	599	1186
36	90	315	462	115	447	900	93	593	1191
37	90	336	496	118	475	901	113	658	1191
38	91	357	536	122	507	925	108	648	1200
39	91	378	585	122	537	934	93	662	1215
40	93	399	635	124	561	932	93	680	1225
41	95	420	685	126	584	936	93	696	1236
42	95	441	730	127	604	943	95	711	1245
43	97	461	774	129	623	954	97	728	1251
44	97	482	815	133	642	979	97	742	1252
45	99	503	869	136	661	997	99	757	1254
46	100	523	914	151	681	1004	100	771	1256
47	104	544	955	153	699	1004	100	786	1261
48	102	564	991	160	715	1008	102	801	1269

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	Item 2A	Item 2A	Item 2A	Item 2A	Item 2A	Item 2A	Item 2A	Item 2A	Item 2A	Item 2A
	12" Tray	12" Tray	12" Tray	12" Tray	12" Tray	12" Tray	12" Tray	12" Tray	12" Tray	12" Tray
	Right Rail	Right Rail	Right Rail	Bare #8	Bare #8	Bare #8	Left Rail	Left Rail	Left Rail	Left Rail
Time	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Max
(min)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
49	104	583	1024	156	729	1018	102	816	1278	
50	106	601	1054	147	741	1036	104	831	1285	
51	106	619	1080	158	756	1058	104	845	1292	
52	108	636	1107	167	769	1078	106	858	1299	
53	109	653	1130	178	782	1099	108	871	1305	
54	108	670	1155	185	795	1123	108	884	1314	
55	109	686	1177	167	805	1148	108	897	1330	
56	111	702	1198	158	818	1173	111	910	1346	
57	111	717	1218	162	831	1198	111	923	1362	
58	113	731	1238	176	844	1220	113	935	1375	
59	115	744	1256	189	858	1242	113	947	1389	
60	117	758	1274	172	869	1260	115	958	1404	
Max Temp:	117	758	1274	189	869	1260	115	958	1404	
Max Allowed:	397	322	398	397	322	398	397	322	398	

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	Item 2B 12" Tray Right Rail	Item 2B 12" Tray Right Rail	Item 2B 12" Tray Right Rail	Item 2B 12" Tray Bare #8	Item 2B 12" Tray Bare #8	Item 2B 12" Tray Bare #8	Item 2B 12" Tray Left Rail	Item 2B 12" Tray Left Rail	Item 2B 12" Tray Left Rail
Time (min)	Min (°F)	Avg (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)
0	72	72	73	72	72	73	72	72	73
1	72	74	79	73	74	77	72	74	81
2	72	75	82	73	75	82	72	76	86
3	73	76	82	73	77	84	73	76	84
4	73	78	82	75	81	84	73	78	82
5	75	80	82	75	82	86	73	80	82
6	76	81	84	77	84	88	73	81	84
7	76	83	86	77	85	90	73	82	86
8	76	84	88	79	87	91	73	84	90
9	77	86	91	79	89	95	75	86	91
10	77	88	93	81	91	97	75	88	95
11	77	91	99	82	95	100	75	90	99
12	78	94	102	82	98	104	75	93	102
13	79	98	108	84	102	108	75	97	108
14	80	101	113	86	106	113	75	100	111
15	81	105	118	88	110	118	75	104	117
16	82	110	124	89	114	124	75	108	122
17	83	114	129	91	119	127	75	112	126
18	85	118	135	92	124	133	75	116	131
19	86	122	140	93	130	140	75	119	136
20	87	127	145	95	136	151	75	124	140
21	89	131	149	96	144	163	75	128	149
22	89	136	158	98	153	176	75	133	160
23	90	143	171	100	163	192	75	139	172
24	91	150	183	100	174	208	75	146	185
25	92	158	199	102	187	226	75	154	201
26	93	168	216	106	200	244	75	163	217
27	94	179	234	109	214	264	75	173	235
28	95	191	253	113	230	286	75	184	255
29	97	204	275	118	245	306	77	195	275
30	99	217	295	124	262	327	77	207	295
31	102	232	316	127	279	349	77	220	316
32	105	247	338	133	296	370	77	233	338
33	110	262	361	138	314	392	77	247	360
34	113	278	385	144	331	414	77	262	383
35	116	294	408	149	350	437	77	277	406
36	119	312	432	154	368	460	77	292	430
37	122	329	457	162	387	484	77	307	453
38	126	347	480	169	407	509	79	324	477
39	129	364	505	176	428	545	79	340	502
40	132	382	529	183	449	579	79	357	527
41	136	400	554	192	470	610	79	374	552
42	139	418	579	199	491	640	79	391	579
43	142	437	606	206	512	669	81	409	606
44	146	455	635	213	532	694	79	427	633
45	149	474	660	219	552	720	79	445	660
46	152	493	687	225	572	741	79	462	685
47	155	513	712	232	592	765	79	480	711
48	158	533	738	238	611	786	81	498	734

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	Item 2B 12" Tray Right Rail	Item 2B 12" Tray Right Rail	Item 2B 12" Tray Right Rail	Item 2B 12" Tray Bare #8	Item 2B 12" Tray Bare #8	Item 2B 12" Tray Bare #8	Item 2B 12" Tray Left Rail	Item 2B 12" Tray Left Rail	Item 2B 12" Tray Left Rail
Time (min)	Min (°F)	Avg (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)
49	162	551	761	245	630	808	81	516	757
50	166	568	784	253	648	828	81	533	779
51	169	586	806	259	665	849	81	550	799
52	173	603	840	266	681	871	81	568	828
53	176	622	871	274	699	901	81	586	860
54	180	640	896	282	716	936	81	604	885
55	184	658	918	290	734	961	82	621	910
56	187	677	937	298	750	968	84	638	930
57	191	694	954	304	766	973	84	655	950
58	195	710	970	312	780	981	86	670	964
59	199	726	984	318	794	990	84	685	981
60	202	740	997	325	806	1002	84	700	995
Max Temp:	202	740	997	325	806	1002	86	700	995
Max Allowed:	397	322	398	397	322	398	397	322	398

	Item 2C 36" Tray Right Rail	Item 2C 36" Tray Right Rail	Item 2C 36" Tray Right Rail	Item 2C 36" Tray Bare #8	Item 2C 36" Tray Bare #8	Item 2C 36" Tray Bare #8	Item 2C 36" Tray Left Rail	Item 2C 36" Tray Left Rail	Item 2C 36" Tray Left Rail
Time (min)	Min (°F)	Avg (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)
0	72	72	73	72	72	73	72	72	73
1	72	73	78	72	76	111	72	74	84
2	72	75	87	72	78	115	73	77	95
3	73	78	86	73	78	106	73	80	93
4	73	81	88	73	80	100	73	84	93
5	75	83	90	73	82	99	73	87	95
6	75	86	93	75	85	99	73	90	99
7	75	88	95	75	87	97	75	92	102
8	75	90	99	75	88	97	75	94	106
9	75	92	100	77	90	99	75	97	109
10	75	94	104	77	91	100	75	100	115
11	75	97	109	77	93	104	75	104	122
12	75	100	115	77	94	106	75	109	127
13	75	103	118	77	96	109	75	114	135
14	75	108	126	77	99	113	77	119	140
15	75	111	131	79	101	118	77	124	147
16	75	116	136	79	105	122	77	130	154
17	75	120	144	79	108	127	77	135	162
18	75	125	149	81	112	133	79	141	169
19	75	129	154	81	117	140	79	146	176
20	77	133	160	82	122	147	79	152	183
21	77	138	165	82	128	156	81	157	192
22	77	142	169	84	135	169	82	164	203
23	77	146	174	86	142	180	82	171	214
24	79	150	180	86	149	190	82	179	225
25	79	155	185	88	159	203	84	188	237
26	79	160	192	90	168	216	84	198	250
27	81	165	201	90	179	230	86	209	264
28	81	171	212	91	191	246	86	222	284
29	81	178	223	93	205	266	86	236	304
30	81	185	234	95	220	286	86	251	325
31	82	192	244	97	237	306	88	267	347
32	82	200	257	99	256	329	88	284	378
33	84	209	271	100	275	352	90	300	405
34	84	220	288	104	296	376	90	318	426
35	86	231	304	106	319	399	91	336	451
36	86	243	320	109	342	424	93	356	478
37	88	257	342	113	367	450	93	376	509
38	90	272	363	115	394	475	95	398	538
39	91	288	387	118	424	522	95	420	568
40	91	305	412	122	454	585	97	444	601
41	99	334	450	127	526	817	97	488	691
42	109	393	534	147	639	1031	100	531	741
43	104	443	739	293	766	1121	102	568	793
44	129	495	788	346	890	1139	118	626	912
45	149	528	882	171	865	1139	226	708	1000
46	118	551	918	165	855	1087	129	714	1051
47	111	574	919	167	855	1072	133	743	1087
48	111	596	930	169	862	1087	151	773	1116

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	Item 2C	Item 2C	Item 2C	Item 2C	Item 2C	Item 2C	Item 2C	Item 2C	Item 2C	Item 2C
	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray
	Right Rail	Right Rail	Right Rail	Bare #8	Bare #8	Bare #8	Left Rail	Left Rail	Left Rail	
Time	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
(min)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	
49	113	619	950	171	874	1107	165	798	1135	
50	115	641	984	172	888	1126	117	820	1155	
51	115	664	1015	172	903	1146	113	843	1175	
52	117	687	1040	176	918	1170	115	864	1191	
53	118	709	1062	180	934	1191	117	884	1206	
54	118	730	1083	183	949	1216	118	902	1220	
55	120	751	1105	185	964	1240	118	919	1234	
56	122	772	1125	185	977	1263	122	934	1249	
57	124	791	1144	187	990	1281	122	949	1263	
58	126	810	1164	187	1001	1299	124	962	1278	
59	126	828	1182	189	1014	1317	126	975	1290	
60	127	845	1200	190	1027	1330	126	988	1303	
Max Temp:	149	845	1200	346	1027	1330	226	988	1303	
Max Allowed:	397	322	398	397	322	398	397	322	398	

	Item 2D 36" Tray									
Time (min)	Min (°F)	Avg (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)	Min (°F)
0	72	72	73	72	73	73	72	73	75	
1	72	75	91	72	75	84	72	75	97	
2	72	78	108	73	78	91	73	77	104	
3	73	78	100	75	81	91	73	79	95	
4	75	81	97	77	84	93	73	81	90	
5	75	83	95	77	87	95	73	83	90	
6	75	85	95	79	90	97	75	85	90	
7	75	87	93	79	91	99	75	87	91	
8	75	88	95	80	93	102	75	88	93	
9	75	90	99	81	96	106	75	90	97	
10	75	94	102	81	99	111	75	93	100	
11	75	97	108	82	103	117	75	96	106	
12	76	101	113	83	107	122	77	100	109	
13	77	105	118	84	112	129	77	104	117	
14	77	110	126	85	117	136	77	109	122	
15	78	115	131	86	123	144	79	114	129	
16	78	120	136	87	128	151	79	120	135	
17	79	125	142	89	135	162	81	125	142	
18	80	129	145	90	142	176	81	130	147	
19	82	134	149	91	151	190	82	134	153	
20	82	139	160	92	161	205	84	138	156	
21	82	146	174	93	174	221	84	141	162	
22	84	155	189	93	190	243	84	146	172	
23	84	166	207	94	207	266	86	154	187	
24	84	178	226	95	227	295	86	164	203	
25	84	192	248	98	247	324	86	176	221	
26	84	208	271	101	269	352	86	189	241	
27	86	224	297	104	291	383	86	205	264	
28	86	242	322	108	314	412	88	221	288	
29	88	260	349	112	338	441	90	238	315	
30	90	279	374	117	362	469	90	257	342	
31	90	299	403	121	386	496	91	275	369	
32	91	320	430	126	411	523	93	295	397	
33	93	341	457	131	436	549	95	315	426	
34	95	363	486	136	461	576	97	336	453	
35	97	386	513	141	487	601	99	358	484	
36	99	409	540	148	513	626	100	380	514	
37	100	433	568	154	539	651	104	403	545	
38	102	457	601	161	566	685	106	426	576	
39	106	482	635	168	592	716	108	449	608	
40	108	506	669	175	618	745	109	473	639	
41	109	531	700	184	643	774	111	497	669	
42	111	555	730	192	667	801	115	521	700	
43	115	578	759	199	690	826	117	544	729	
44	115	601	786	208	712	849	118	567	754	
45	118	623	813	216	733	873	122	591	783	
46	120	649	865	226	755	903	124	614	815	
47	124	673	901	235	777	936	127	642	882	
48	129	695	928	245	801	961	136	666	909	

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	Item 2D	Item 2D	Item 2D	Item 2D	Item 2D	Item 2D	Item 2D	Item 2D	Item 2D	Item 2D
	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray	36" Tray
	Right Rail	Right Rail	Right Rail	Bare #8	Bare #8	Bare #8	Left Rail	Left Rail	Left Rail	
Time	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
(min)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)	
49	129	715	950	254	822	972	138	687	930	
50	129	735	968	263	839	982	136	707	946	
51	129	754	986	271	855	993	136	726	964	
52	131	773	1002	278	870	1008	136	744	981	
53	133	791	1018	286	883	1022	140	762	999	
54	135	810	1035	294	893	1038	142	781	1015	
55	140	827	1049	302	904	1053	144	798	1031	
56	140	842	1063	310	915	1065	145	814	1045	
57	140	857	1078	317	927	1080	147	831	1060	
58	142	871	1090	325	937	1092	151	846	1074	
59	144	884	1105	329	947	1105	151	861	1087	
60	145	896	1116	333	957	1117	153	874	1101	
Max Temp:	145	896	1116	333	957	1117	153	874	1101	
Max Allowed:	397	322	398	397	323	398	397	323	400	

	Item 2E Air Drop Bare #8	Item 2E Air Drop Bare #8	Item 2E Air Drop Bare #8	Item 2F Air Drop Bare #8	Item 2F Air Drop Bare #8	Item 2F Air Drop Bare #8	Item 2G Junction	Item 2G Junction	Item 2G Junction
Time (min)	Min (°F)	Average (°F)	Max (°F)	Min (°F)	Average (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)
0	72	73	73	72	72	73	72	72	73
1	72	73	74	72	72	73	72	72	73
2	72	74	78	72	73	75	72	73	73
3	73	76	84	72	74	78	73	75	79
4	73	78	89	72	76	84	75	78	84
5	73	81	94	72	79	90	79	83	88
6	73	85	98	73	83	97	81	86	91
7	74	88	104	73	86	103	84	90	97
8	75	92	111	73	91	110	86	93	100
9	75	96	119	75	96	117	90	96	104
10	76	100	128	75	101	126	93	101	109
11	77	105	136	75	106	136	97	105	115
12	78	111	145	77	113	144	100	110	120
13	79	116	153	79	119	151	106	116	127
14	80	122	163	79	124	157	111	122	135
15	81	129	174	81	130	162	118	130	144
16	83	135	185	82	135	171	126	138	151
17	84	142	195	84	140	180	133	146	160
18	86	148	206	86	146	194	142	154	172
19	87	154	217	88	150	213	151	163	185
20	89	160	228	90	155	229	158	170	198
21	91	166	240	91	159	245	167	178	210
22	93	171	252	93	164	261	174	186	219
23	94	175	265	93	171	277	180	195	228
24	96	180	278	95	179	294	187	204	234
25	98	186	290	97	190	314	196	215	243
26	100	192	303	99	202	337	208	227	253
27	102	200	316	100	218	364	221	240	273
28	104	208	330	102	236	392	234	255	295
29	106	218	345	106	257	421	248	272	320
30	108	229	362	108	278	452	262	291	345
31	110	243	380	111	302	483	280	312	372
32	113	258	401	115	327	516	300	334	399
33	116	277	424	120	353	549	322	357	428
34	119	298	450	126	380	584	345	383	457
35	122	322	477	131	408	619	372	409	486
36	126	350	507	136	437	652	401	437	514
37	131	382	538	144	465	685	428	465	543
38	136	417	592	151	494	718	457	494	572
39	142	458	676	158	522	750	487	524	601
40	148	502	773	167	552	782	518	555	630
41	156	551	889	174	581	812	550	587	658
42	165	603	1030	181	609	841	585	621	689
43	174	655	1137	190	637	870	619	655	721
44	186	705	1199	198	664	899	655	691	756
45	198	756	1264	205	691	929	691	727	788
46	209	808	1319	214	718	959	725	762	819
47	220	860	1374	223	745	988	761	799	851
48	231	910	1424	230	771	1016	799	836	892

	Item 2E Air Drop Bare #8	Item 2E Air Drop Bare #8	Item 2E Air Drop Bare #8	Item 2F Air Drop Bare #8	Item 2F Air Drop Bare #8	Item 2F Air Drop Bare #8	Item 2G Junction Box	Item 2G Junction Box	Item 2G Junction Box
Time (min)	Min (°F)	Average (°F)	Max (°F)	Min (°F)	Average (°F)	Max (°F)	Min (°F)	Avg (°F)	Max (°F)
49	243	956	1464	241	797	1047	838	875	937
50	255	995	1506	248	823	1081	882	917	977
51	267	1027	1537	257	848	1117	925	959	1015
52	280	1062	1576	268	874	1152	970	1001	1054
53	294	1094	1598	277	900	1184	1013	1042	1090
54	307	1124	1623	286	926	1218	1056	1081	1128
55	321	1153	1650	297	952	1252	1098	1119	1161
56	335	1178	1664	307	979	1285	1134	1154	1195
57	348	1202	1678	320	1007	1317	1170	1189	1227
58	362	1225	1691	331	1036	1351	1206	1221	1258
59	374	1248	1701	342	1065	1380	1240	1252	1287
60	387	1270	1712	352	1094	1411	1269	1282	1315
Max Temp:	387	1270	1712	352	1094	1411	1269	1282	1315
Max Allowed:	397	323	398	397	322	398	397	322	398

Time (min)	E119 Std	Furnace Average (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)	Furnace Probe	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)
0	68	73	0	0	0.00%	75	74	73	74	73	73
1	254	179	58	466	-87.5%	168	112	171	274	134	
2	441	431	295	932	-68.4%	342	231	371	606	273	
3	627	739	812	1,398	-41.9%	558	422	630	935	489	
4	814	924	1,575	1,864	-15.5%	716	623	864	1076	706	
5	1,000	1,020	2,478	2,330	6.37%	824	780	998	1131	863	
6	1,060	1,077	3,459	3,412	1.36%	902	893	1069	1168	969	
7	1,120	1,115	4,486	4,494	-0.17%	962	973	1113	1190	1040	
8	1,180	1,149	5,550	5,576	-0.46%	1012	1034	1145	1219	1089	
9	1,240	1,195	6,654	6,658	-0.06%	1067	1083	1214	1266	1140	
10	1,300	1,245	7,806	7,740	0.85%	1124	1126	1279	1318	1191	
11	1,328	1,286	9,004	9,022	-0.20%	1174	1167	1328	1354	1236	
12	1,347	1,322	10,240	10,304	-0.62%	1218	1202	1362	1388	1273	
13	1,364	1,359	11,512	11,586	-0.64%	1259	1238	1394	1428	1307	
14	1,381	1,394	12,820	12,868	-0.37%	1296	1273	1427	1471	1339	
15	1,396	1,421	14,159	14,150	0.07%	1325	1303	1451	1497	1363	
16	1,410	1,438	15,521	15,514	0.05%	1343	1324	1465	1509	1381	
17	1,424	1,452	16,898	16,878	0.12%	1356	1340	1474	1525	1395	
18	1,436	1,466	18,290	18,242	0.26%	1372	1354	1487	1538	1409	
19	1,448	1,473	19,691	19,606	0.43%	1384	1365	1493	1542	1419	
20	1,459	1,479	21,099	20,970	0.62%	1395	1373	1499	1547	1427	
21	1,470	1,487	22,515	22,386	0.57%	1405	1380	1504	1555	1435	
22	1,480	1,495	23,938	23,802	0.57%	1417	1387	1515	1562	1446	
23	1,490	1,504	25,369	25,218	0.60%	1428	1398	1521	1570	1456	
24	1,499	1,513	26,810	26,634	0.66%	1440	1406	1532	1577	1465	
25	1,508	1,522	28,259	28,050	0.75%	1451	1418	1539	1587	1475	
26	1,517	1,526	29,715	29,512	0.69%	1457	1428	1541	1592	1481	
27	1,525	1,531	31,176	30,974	0.65%	1464	1437	1544	1595	1486	
28	1,533	1,536	32,641	32,436	0.63%	1470	1448	1547	1600	1493	
29	1,541	1,543	34,112	33,898	0.63%	1476	1458	1552	1607	1499	
30	1,549	1,548	35,590	35,360	0.65%	1483	1464	1557	1612	1505	
31	1,556	1,555	37,074	36,875	0.54%	1490	1474	1565	1620	1514	
32	1,563	1,562	38,565	38,390	0.46%	1498	1483	1572	1626	1522	
33	1,570	1,569	40,063	39,905	0.40%	1505	1492	1577	1635	1528	
34	1,576	1,577	41,568	41,420	0.36%	1513	1501	1583	1643	1535	
35	1,583	1,585	43,081	42,935	0.34%	1522	1512	1592	1650	1545	
36	1,589	1,595	44,603	44,450	0.34%	1533	1525	1601	1659	1556	
37	1,595	1,604	46,135	45,965	0.37%	1545	1535	1611	1668	1566	
38	1,601	1,609	47,673	47,480	0.41%	1550	1541	1615	1672	1572	
39	1,606	1,615	49,217	48,995	0.45%	1559	1550	1625	1675	1581	
40	1,612	1,616	50,764	50,510	0.50%	1558	1550	1623	1675	1581	
41	1,617	1,622	52,315	52,111	0.39%	1560	1554	1627	1679	1582	
42	1,623	1,629	53,872	53,712	0.30%	1565	1555	1632	1681	1587	
43	1,628	1,626	55,432	55,314	0.21%	1565	1550	1632	1673	1585	
44	1,633	1,623	56,988	56,915	0.13%	1564	1547	1631	1671	1583	
45	1,638	1,622	58,542	58,516	0.05%	1562	1548	1631	1673	1583	
46	1,643	1,626	60,098	60,117	-0.03%	1567	1551	1634	1678	1587	
47	1,648	1,636	61,661	61,718	-0.09%	1576	1563	1643	1696	1598	
48	1,652	1,646	63,234	63,320	-0.13%	1587	1574	1654	1704	1610	
49	1,657	1,653	64,816	64,921	-0.16%	1599	1589	1664	1708	1620	

Time (min)	E119 Std	Integration of Furnace		Integration of E119 Std		Error (%)	Furnace Probe				
		Average (°F)	Furnace Average (°F)	Average (°F•min)	Average (°F•min)		#1 (°F)	#2 (°F)	#3 (°F)	#4 (°F)	#5 (°F)
50	1,661	1,659	66,404	66,522	-0.18%	1607	1597	1670	1712	1627	
51	1,666	1,664	67,997	68,123	-0.18%	1610	1600	1675	1716	1631	
52	1,670	1,669	69,596	69,724	-0.18%	1624	1608	1679	1722	1638	
53	1,674	1,673	71,199	71,326	-0.18%	1632	1617	1683	1723	1645	
54	1,678	1,678	72,807	72,927	-0.16%	1638	1623	1686	1727	1651	
55	1,682	1,683	74,419	74,528	-0.15%	1643	1628	1690	1732	1655	
56	1,686	1,687	76,036	76,129	-0.12%	1645	1633	1697	1736	1662	
57	1,690	1,692	77,658	77,730	-0.09%	1650	1639	1701	1741	1668	
58	1,694	1,697	79,284	79,332	-0.06%	1656	1644	1706	1748	1674	
59	1,698	1,701	80,915	80,933	-0.02%	1661	1648	1710	1751	1678	
60	1,701	1,706	82,550	82,534	0.02%	1667	1654	1715	1757	1684	

Time (min)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)	Furnace Probe #9 (°F)	Furnace Probe #10 (°F)	Furnace Probe #11 (°F)	Furnace Probe #12 (°F)	Furnace TC #13 (°F)	Furnace Probe #14 (°F)	Furnace TC #40 (°F)
0	73	73	73	73	74	73	73	73	73	72
1	151	302	154	143	137	211	240	161	144	72
2	372	694	551	372	399	435	631	415	343	72
3	687	966	974	700	765	749	1041	769	654	72
4	925	1088	1077	887	951	952	1145	1014	906	72
5	1038	1144	1105	976	1031	1054	1177	1120	1033	72
6	1098	1178	1116	1028	1073	1117	1195	1167	1102	72
7	1137	1198	1129	1066	1101	1155	1207	1194	1143	72
8	1168	1218	1148	1094	1129	1194	1235	1226	1175	72
9	1211	1257	1178	1133	1166	1253	1275	1263	1225	72
10	1260	1299	1216	1179	1210	1315	1321	1306	1281	72
11	1303	1337	1252	1220	1251	1352	1363	1345	1326	72
12	1339	1365	1284	1256	1288	1389	1399	1380	1361	72
13	1374	1398	1317	1293	1325	1433	1440	1419	1397	72
14	1404	1434	1346	1325	1355	1470	1483	1456	1434	72
15	1433	1462	1368	1352	1379	1501	1511	1484	1464	72
16	1453	1477	1387	1371	1398	1516	1530	1502	1481	72
17	1469	1492	1404	1389	1415	1521	1547	1515	1490	72
18	1482	1503	1421	1405	1431	1533	1558	1527	1504	72
19	1489	1508	1433	1418	1440	1535	1560	1531	1508	72
20	1494	1514	1442	1428	1448	1536	1563	1536	1510	72
21	1499	1519	1451	1437	1455	1545	1570	1542	1518	72
22	1506	1525	1461	1447	1463	1555	1576	1548	1527	72
23	1516	1534	1471	1457	1472	1559	1583	1556	1533	72
24	1525	1542	1481	1468	1481	1567	1593	1566	1543	72
25	1534	1551	1490	1478	1491	1573	1597	1573	1548	72
26	1539	1555	1498	1485	1498	1567	1603	1576	1545	72
27	1543	1559	1505	1491	1502	1572	1602	1579	1549	72
28	1548	1566	1512	1498	1507	1577	1605	1583	1553	72
29	1555	1573	1519	1505	1514	1581	1612	1588	1559	72
30	1561	1579	1527	1511	1520	1587	1613	1593	1566	72
31	1567	1584	1533	1518	1526	1594	1620	1599	1572	72
32	1574	1592	1541	1526	1533	1599	1625	1604	1577	72
33	1582	1599	1548	1533	1541	1605	1632	1611	1583	72
34	1590	1607	1557	1541	1549	1612	1641	1619	1590	72
35	1598	1617	1567	1549	1556	1618	1649	1625	1596	72
36	1608	1628	1576	1558	1565	1622	1660	1632	1603	73
37	1618	1640	1586	1569	1574	1629	1670	1639	1610	72
38	1622	1641	1590	1574	1580	1635	1671	1645	1615	73
39	1627	1649	1598	1581	1586	1634	1673	1649	1619	73
40	1628	1650	1600	1583	1589	1639	1671	1652	1621	73
41	1631	1652	1605	1588	1597	1645	1689	1665	1627	72
42	1638	1656	1614	1597	1608	1653	1706	1678	1634	73
43	1635	1652	1614	1596	1608	1651	1696	1674	1633	72
44	1632	1647	1612	1593	1605	1648	1692	1666	1630	73
45	1632	1651	1610	1594	1603	1647	1685	1661	1628	73
46	1635	1660	1615	1599	1606	1650	1683	1663	1632	72
47	1647	1669	1622	1607	1614	1659	1700	1675	1640	72
48	1656	1680	1633	1614	1621	1668	1707	1682	1650	72
49	1664	1689	1642	1623	1628	1669	1707	1686	1655	73

	Furnace Probe	Furnace TC #13	Furnace TC #14	Furnace TC #40						
Time (min)	#6 (°F)	#7 (°F)	#8 (°F)	#9 (°F)	#10 (°F)	#11 (°F)	#12 (°F)	(°F)	(°F)	(°F)
50	1669	1694	1647	1632	1634	1674	1712	1690	1661	72
51	1673	1697	TC Failed	1634	1637	1682	1714	1694	1666	72
52	1678	1701	TC Failed	1645	1646	1680	1713	1698	1669	73
53	1682	1706	TC Failed	1652	1650	1681	1713	1700	1671	73
54	1686	1710	TC Failed	1658	1655	1683	1719	1705	1676	72
55	1690	1711	TC Failed	1664	1661	1690	1720	1709	1682	73
56	1694	1718	TC Failed	1668	1664	1696	1726	1712	1685	73
57	1697	1721	TC Failed	1671	1668	1699	1733	1717	1689	72
58	1700	1726	TC Failed	1672	1673	1702	1741	1721	1693	73
59	1705	1730	TC Failed	1679	1678	1706	1740	1724	1698	73
60	1708	1734	TC Failed	1682	1682	1710	1748	1730	1701	73

Time (min)	TC #1 (°F)	TC #2 (°F)	TC #3 (°F)	TC #4 (°F)	TC #5 (°F)	TC #6 (°F)	TC #7 (°F)	TC #8 (°F)	TC #9 (°F)	TC #10 (°F)	TC #11 (°F)	TC #12 (°F)	TC #13 (°F)
0	72	72	72	72	72	72	72	72	72	72	72	72	72
1	72	72	72	72	72	72	72	72	72	72	72	73	73
2	72	72	73	73	72	73	73	73	72	73	73	73	73
3	72	73	75	75	73	77	77	75	73	77	79	75	75
4	73	77	81	79	75	81	81	81	77	81	86	77	79
5	73	79	84	81	79	84	84	84	79	84	91	81	82
6	75	81	86	84	81	88	88	88	82	88	95	84	86
7	75	82	90	88	82	91	91	91	84	90	99	88	90
8	75	84	91	90	86	93	95	95	88	93	100	91	93
9	77	84	93	93	88	97	99	99	90	95	104	95	97
10	77	86	95	95	90	100	102	104	93	99	109	99	100
11	77	86	97	99	93	104	108	108	95	102	113	102	102
12	77	88	100	102	97	109	111	111	99	106	118	106	104
13	77	88	102	106	100	115	117	117	102	111	126	111	109
14	77	90	104	109	104	118	122	122	106	115	133	115	113
15	77	90	108	113	109	124	127	127	111	120	138	120	118
16	77	91	111	118	115	129	133	133	115	127	145	127	126
17	79	93	115	122	120	136	138	140	120	133	153	133	133
18	79	95	118	126	126	142	145	145	126	140	158	140	140
19	79	97	122	131	131	149	153	153	133	147	165	145	147
20	79	99	127	135	136	156	158	160	138	154	171	153	154
21	81	102	131	140	142	162	165	165	145	160	178	160	162
22	81	104	136	144	147	169	172	172	153	167	190	165	169
23	82	108	142	149	153	176	180	180	160	174	201	169	174
24	82	109	147	154	158	181	187	185	165	183	212	174	180
25	82	111	154	160	163	189	196	194	172	192	223	178	185
26	84	115	160	167	169	196	205	207	178	201	235	185	194
27	84	117	167	174	174	205	214	216	185	212	250	196	212
28	84	118	176	181	178	214	223	226	192	221	264	208	226
29	84	122	183	190	183	223	232	239	203	234	280	223	243
30	86	126	192	199	190	234	243	252	214	246	298	241	261
31	86	129	203	208	199	244	253	264	225	261	316	261	282
32	86	133	214	219	208	255	264	277	237	277	336	282	304
33	88	136	226	232	219	268	277	293	252	295	358	309	331
34	88	140	239	246	230	280	288	309	266	311	379	342	363
35	90	144	252	261	241	295	302	327	282	329	401	378	397
36	90	149	266	277	253	311	316	345	298	349	424	421	437
37	90	154	280	291	266	327	331	367	316	369	450	480	486
38	91	158	291	306	279	345	347	387	334	388	475	536	532
39	91	163	304	322	293	363	365	406	352	408	500	585	577
40	93	167	316	336	309	381	385	428	372	428	525	635	624
41	95	172	327	351	324	401	405	448	390	450	552	685	673
42	95	176	338	365	340	419	424	468	410	469	577	730	718
43	97	180	347	378	356	437	442	487	428	489	604	774	761
44	97	185	358	392	372	455	462	505	448	509	631	815	795
45	99	189	367	405	387	473	480	525	466	531	658	869	849
46	100	192	376	417	403	489	498	543	484	550	684	914	900
47	104	198	385	430	419	507	516	563	504	572	711	955	941
48	102	201	392	441	432	522	532	581	522	594	738	991	977
49	104	207	401	451	446	538	550	599	540	615	763	1024	1008
50	106	212	410	464	462	552	567	617	558	637	788	1054	1035
51	106	216	419	475	475	567	579	633	576	657	822	1080	1058

Time (min)	TC #14 (°F)	TC #15 (°F)	TC #16 (°F)	TC #17 (°F)	TC #18 (°F)	TC #19 (°F)	TC #20 (°F)	TC #21 (°F)	TC #22 (°F)	TC #23 (°F)	TC #24 (°F)
0	72	72	72	72	72	72	73	73	73	72	72
1	73	72	72	72	72	73	73	73	73	73	72
2	73	73	73	73	73	73	73	73	73	73	72
3	75	77	75	75	75	75	73	75	73	75	73
4	81	82	79	79	77	77	77	77	75	77	73
5	86	86	84	82	81	81	79	82	77	79	75
6	90	90	86	86	84	84	82	86	79	79	75
7	93	93	90	90	88	88	86	90	81	81	77
8	97	97	91	95	91	90	90	91	82	81	77
9	100	100	93	100	95	93	91	93	86	82	77
10	104	106	97	106	100	95	95	97	88	84	77
11	108	109	100	111	106	99	97	99	90	84	77
12	111	115	106	118	111	102	100	100	90	86	77
13	117	122	111	126	117	108	104	104	93	88	77
14	122	129	117	133	124	111	108	108	95	90	79
15	129	136	122	142	129	117	111	111	97	91	79
16	136	144	129	149	136	124	115	115	100	93	79
17	142	151	135	158	144	129	120	120	104	95	79
18	149	158	140	167	151	135	126	126	108	99	79
19	156	165	145	176	158	140	131	131	111	100	81
20	162	171	151	183	163	145	136	136	117	104	81
21	169	178	158	194	171	153	142	142	120	108	82
22	174	183	163	201	178	158	147	147	126	111	82
23	181	192	169	212	185	163	153	153	129	113	82
24	187	207	176	221	194	171	158	158	133	117	84
25	192	219	187	230	201	176	163	163	136	118	84
26	207	234	198	239	208	185	169	169	140	122	86
27	225	248	208	248	217	194	174	176	144	124	86
28	241	264	219	259	226	205	180	183	147	126	86
29	259	282	232	268	237	216	185	192	151	129	88
30	280	302	244	279	250	226	194	201	154	131	88
31	302	324	259	289	262	241	208	212	158	135	88
32	327	347	275	300	277	259	226	225	163	136	90
33	360	374	297	313	300	288	257	248	174	144	320
34	392	405	320	325	327	324	298	279	189	149	237
35	424	433	342	340	358	367	349	306	201	154	171
36	459	462	361	356	383	405	388	327	212	158	93
37	496	493	383	372	410	439	421	351	221	162	279
38	532	523	405	388	439	471	451	374	232	167	108
39	568	554	428	406	468	502	482	399	244	172	93
40	606	585	448	426	496	531	509	424	257	178	93
41	646	615	471	446	525	559	534	450	271	185	93
42	684	648	493	466	554	588	561	471	286	192	95
43	721	680	516	486	583	615	586	493	300	199	97
44	759	712	540	507	610	644	610	513	316	208	97
45	792	745	563	529	639	671	633	532	333	216	99
46	833	775	586	550	666	696	657	550	347	226	100
47	876	804	613	574	693	720	678	568	365	235	100
48	916	847	640	595	720	745	700	586	381	246	102
49	952	883	667	619	747	766	720	603	399	257	102
50	981	918	693	640	770	786	739	621	417	268	104
51	1006	948	718	664	795	811	757	639	437	280	104

Time (min)	TC #14 (°F)	TC #15 (°F)	TC #16 (°F)	TC #17 (°F)	TC #18 (°F)	TC #19 (°F)	TC #20 (°F)	TC #21 (°F)	TC #22 (°F)	TC #23 (°F)	TC #24 (°F)
52	1027	973	743	685	828	846	774	655	455	291	106
53	1047	995	770	705	856	876	792	673	473	302	108
54	1067	1015	799	727	883	901	815	691	493	315	108
55	1085	1033	828	748	907	925	837	705	511	325	108
56	1101	1049	856	768	927	943	856	721	529	336	111
57	1121	1065	882	790	946	957	876	738	547	349	111
58	1137	1081	903	811	963	970	894	752	563	360	113
59	1153	1096	923	833	979	981	909	766	577	370	113
60	1170	1110	943	853	993	995	923	781	594	381	115
Max Temp:	1170	1110	943	853	993	995	923	781	594	381	320
Max Allowed:	397	397	397	397	397	397	398	398	398	397	397

Time (min)	TC #25 (°F)	TC #26 (°F)	TC #27 (°F)	TC #28 (°F)	TC #29 (°F)	TC #30 (°F)	TC #31 (°F)	TC #32 (°F)	TC #33 (°F)	TC #34 (°F)	TC #35 (°F)
0	72	72	72	73	72	73	72	72	72	72	72
1	72	72	72	77	73	73	72	72	72	72	73
2	73	73	73	79	73	75	73	73	72	73	73
3	79	81	79	79	81	79	77	75	75	77	75
4	84	86	84	82	88	84	82	77	79	82	79
5	88	91	88	84	93	91	88	81	82	86	82
6	90	93	90	86	97	97	91	84	86	90	86
7	91	97	93	90	100	100	95	86	90	93	90
8	93	99	95	91	104	104	99	90	91	97	93
9	93	100	97	95	108	108	102	91	95	99	95
10	95	102	100	97	113	111	106	95	97	102	99
11	97	106	104	100	118	115	109	99	100	106	102
12	99	109	108	106	124	120	115	102	106	111	106
13	100	113	113	111	129	126	120	108	109	115	111
14	104	118	118	115	136	131	127	111	115	122	115
15	106	122	124	120	144	138	133	117	120	127	118
16	109	127	129	127	151	145	140	122	126	133	126
17	111	133	136	133	158	151	147	127	133	138	131
18	115	136	142	140	165	158	154	135	140	145	140
19	118	142	147	145	172	165	162	140	147	153	147
20	122	147	153	153	181	171	169	147	153	160	156
21	126	154	158	158	192	178	176	154	162	169	165
22	129	160	165	165	203	185	187	162	171	178	178
23	133	169	172	172	216	199	198	169	181	192	192
24	136	180	183	178	230	214	210	176	192	210	212
25	140	190	194	187	244	228	223	183	207	230	234
26	144	203	207	198	261	243	235	194	221	253	261
27	147	216	219	208	279	259	252	207	237	280	291
28	153	230	234	221	298	279	268	219	257	309	329
29	156	244	252	235	320	300	286	234	279	342	370
30	162	262	270	252	343	324	306	250	300	372	412
31	169	279	289	268	367	352	325	266	324	403	451
32	180	298	309	288	394	387	349	286	347	433	498
33	271	356	378	457	455	457	426	356	412	475	603
34	459	441	509	450	527	534	595	403	626	604	676
35	525	412	507	387	532	482	540	372	556	698	725
36	414	369	507	378	493	498	455	372	468	684	925
37	437	486	468	469	559	579	570	435	522	716	1080
38	268	397	423	435	550	558	509	428	541	738	1112
39	221	410	439	450	574	583	534	444	554	772	1098
40	226	424	457	475	599	612	561	468	586	799	1105
41	230	441	475	498	626	640	586	491	615	826	1103
42	237	459	493	520	651	667	613	516	644	842	1110
43	241	478	509	543	676	696	639	541	673	867	1121
44	246	480	525	565	702	721	662	565	698	889	1134
45	252	480	540	586	725	747	685	590	721	910	1150
46	255	486	552	608	748	770	707	613	741	932	1166
47	259	489	565	630	770	792	729	637	766	955	1186
48	262	496	577	649	790	815	750	660	788	977	1207
49	264	500	590	669	811	838	772	684	813	1000	1229
50	270	505	603	691	833	860	788	705	838	1022	1247
51	271	513	615	711	853	880	806	729	860	1042	1261

Time (min)	TC #25 (°F)	TC #26 (°F)	TC #27 (°F)	TC #28 (°F)	TC #29 (°F)	TC #30 (°F)	TC #31 (°F)	TC #32 (°F)	TC #33 (°F)	TC #34 (°F)	TC #35 (°F)
52	275	518	628	730	873	896	828	750	885	1062	1278
53	279	525	639	750	887	912	846	772	907	1081	1294
54	282	532	653	770	903	928	865	793	930	1101	1314
55	286	540	664	788	921	946	885	817	954	1121	1330
56	289	547	675	808	939	966	901	838	975	1141	1346
57	293	554	687	828	957	986	921	862	997	1159	1362
58	295	561	700	846	973	1000	941	883	1018	1177	1375
59	298	568	712	864	988	1011	959	907	1038	1193	1389
60	302	576	723	878	1000	1020	973	927	1054	1207	1404
Max Temp:	525	576	723	878	1000	1020	973	927	1054	1207	1404
Max Allowed:	397	397	397	398	397	398	397	397	397	397	397

Time (min)	TC #36 (°F)	TC #37 (°F)	TC #38 (°F)	TC #39 (°F)	TC #40 (°F)	TC #41 (°F)	TC #42 (°F)	TC #43 (°F)	TC #44 (°F)	TC #45 (°F)	TC #46 (°F)
0	72	72	72	72	73	72	72	72	72	73	72
1	73	73	73	72	73	72	75	73	73	73	72
2	75	75	75	75	73	75	86	84	77	73	73
3	77	84	84	77	73	79	91	99	84	75	75
4	82	90	91	81	75	84	99	106	95	77	77
5	88	95	97	86	77	88	104	111	102	79	77
6	91	99	102	90	81	91	108	118	109	82	79
7	93	102	106	91	82	93	111	122	113	84	81
8	97	106	111	95	84	97	118	127	118	88	82
9	100	111	117	99	86	100	126	135	124	91	82
10	106	115	124	102	90	104	135	142	129	93	84
11	111	122	131	108	93	111	147	149	131	95	86
12	117	129	140	113	97	118	165	160	133	97	88
13	122	138	149	120	100	127	190	176	138	99	90
14	127	147	158	129	104	138	219	198	145	100	91
15	135	158	167	140	109	151	252	225	156	104	93
16	142	172	178	154	115	165	288	255	169	108	95
17	149	189	196	174	120	183	331	325	183	115	97
18	158	212	221	196	127	207	383	361	201	120	100
19	165	234	248	217	135	230	430	394	223	127	102
20	178	257	279	239	142	252	473	432	248	136	106
21	190	284	313	262	151	277	514	473	275	145	108
22	203	311	349	288	158	302	556	516	306	162	111
23	217	340	387	313	167	327	597	565	342	183	115
24	234	369	426	342	178	358	644	615	383	205	118
25	253	399	464	370	189	388	684	662	426	230	122
26	275	428	500	399	203	419	721	709	475	255	127
27	298	459	536	430	217	448	750	752	523	280	133
28	324	491	570	460	234	475	774	793	574	307	140
29	352	525	603	493	250	504	801	838	633	338	145
30	381	558	637	559	268	532	824	883	711	379	154
31	412	594	669	622	288	558	847	928	772	406	162
32	446	633	702	628	309	585	874	975	817	437	171
33	489	687	743	660	381	648	936	1083	927	468	187
34	601	802	817	732	385	738	1015	1150	1022	511	212
35	626	873	851	777	430	711	1074	1186	1047	561	223
36	622	838	853	804	419	739	1087	1191	1049	622	232
37	786	964	997	889	448	763	1090	1191	1054	648	244
38	856	988	1026	925	482	802	1107	1200	1065	671	257
39	923	997	1024	943	513	826	1116	1215	1072	693	270
40	984	1011	1026	952	545	844	1126	1225	1083	711	282
41	986	1029	1035	970	576	865	1139	1236	1092	725	293
42	995	1042	1044	990	608	887	1152	1245	1098	736	302
43	1009	1056	1056	1009	640	910	1162	1251	1107	747	311
44	1026	1071	1067	1029	673	930	1170	1252	1108	756	320
45	1042	1083	1078	1049	705	950	1179	1254	1108	766	327
46	1060	1098	1090	1071	736	970	1188	1256	1110	775	334
47	1078	1112	1105	1098	768	990	1202	1261	1112	786	343
48	1096	1128	1119	1114	799	1009	1215	1269	1116	799	352
49	1116	1144	1134	1128	828	1027	1225	1278	1123	811	360
50	1134	1161	1150	1141	856	1042	1234	1285	1130	824	370
51	1152	1177	1164	1155	883	1058	1245	1292	1137	837	379

Time (min)	TC #36 (°F)	TC #37 (°F)	TC #38 (°F)	TC #39 (°F)	TC #40 (°F)	TC #41 (°F)	TC #42 (°F)	TC #43 (°F)	TC #44 (°F)	TC #45 (°F)	TC #46 (°F)
52	1170	1191	1177	1168	910	1067	1251	1299	1144	847	387
53	1188	1207	1189	1180	936	1080	1258	1305	1152	858	396
54	1206	1222	1202	1193	961	1092	1267	1312	1161	871	405
55	1224	1236	1216	1206	982	1103	1272	1317	1166	878	414
56	1240	1251	1227	1216	1004	1116	1283	1323	1170	891	423
57	1256	1265	1240	1229	1022	1128	1292	1330	1177	901	432
58	1270	1279	1251	1240	1040	1143	1301	1337	1179	910	441
59	1287	1292	1263	1252	1054	1153	1308	1344	1186	923	451
60	1301	1306	1274	1261	1069	1164	1317	1350	1193	936	464
Max Temp:	1301	1306	1274	1261	1069	1164	1317	1350	1193	936	464
Max Allowed:	397	397	397	397	398	397	397	397	397	398	397

Time (min)	TC #47 (°F)	TC #48 (°F)	TC #49 (°F)	TC #50 (°F)	TC #51 (°F)	TC #52 (°F)	TC #53 (°F)	TC #54 (°F)	TC #55 (°F)	TC #56 (°F)	TC #57 (°F)
0	72	72	72	72	72	72	72	72	72	72	72
1	72	72	72	73	72	72	72	72	72	72	72
2	72	73	73	75	73	73	75	73	72	72	73
3	73	77	81	82	81	81	82	79	77	73	73
4	75	82	86	90	88	86	88	86	81	77	75
5	75	84	90	93	93	91	93	90	86	81	77
6	77	88	93	95	95	95	97	93	90	84	81
7	79	88	93	97	97	97	99	97	93	86	84
8	79	90	95	99	99	99	100	99	95	90	88
9	81	90	97	100	100	100	102	100	97	91	90
10	81	90	97	100	102	104	106	102	99	95	93
11	81	91	99	102	106	106	109	104	100	97	95
12	82	93	102	106	108	111	115	109	104	99	97
13	82	93	104	108	111	115	118	113	106	100	97
14	82	95	108	111	115	118	124	118	109	104	99
15	82	97	109	115	120	124	133	124	115	106	100
16	84	100	113	118	126	131	140	131	118	109	102
17	84	102	117	124	131	140	149	138	126	113	106
18	86	104	122	131	140	149	160	147	133	118	111
19	86	108	127	138	149	158	171	156	140	124	115
20	86	109	133	147	160	169	183	167	149	129	122
21	88	113	140	158	171	180	196	180	158	136	127
22	90	117	147	169	181	190	210	192	169	144	135
23	91	122	154	178	194	205	226	205	180	153	142
24	91	126	163	189	207	219	243	219	190	162	151
25	93	133	174	201	221	235	259	235	203	172	160
26	95	138	185	214	235	252	275	252	216	183	169
27	97	144	194	226	252	270	293	266	230	194	180
28	99	149	207	241	268	286	309	284	246	208	192
29	100	156	219	257	286	306	327	300	262	223	205
30	102	162	232	273	304	324	345	318	280	239	221
31	104	169	244	289	322	342	361	334	297	255	239
32	106	176	259	306	342	361	379	352	315	275	261
33	108	183	273	324	360	381	397	370	334	297	284
34	109	192	288	340	381	401	415	388	352	320	309
35	113	199	302	358	401	421	433	406	372	345	338
36	115	208	316	376	421	441	451	424	392	369	369
37	118	216	329	394	441	459	469	444	412	394	403
38	122	225	343	410	460	478	487	462	433	421	441
39	122	232	358	426	478	496	505	480	453	450	478
40	124	239	370	441	496	514	522	496	471	475	509
41	126	248	379	457	514	531	541	516	493	500	541
42	127	253	392	469	531	549	558	534	511	525	574
43	129	261	403	482	549	567	576	550	529	550	606
44	133	268	415	496	565	583	590	567	549	577	635
45	136	277	426	509	581	599	608	583	568	604	664
46	151	291	437	522	599	613	626	603	592	631	691
47	153	300	448	536	612	630	642	621	612	658	721
48	160	313	455	550	628	646	658	635	631	685	754
49	156	315	464	561	640	658	671	651	649	712	781
50	147	315	473	572	653	675	682	667	666	734	806
51	158	334	489	588	666	694	700	682	684	757	833

Time (min)	TC #58 (°F)	TC #59 (°F)	TC #60 (°F)	TC #61 (°F)	TC #62 (°F)	TC #63 (°F)	TC #64 (°F)	TC #65 (°F)	TC #66 (°F)	TC #67 (°F)	TC #68 (°F)
0	72	73	72	72	72	72	72	72	73	73	73
1	75	77	73	72	72	72	72	73	73	73	73
2	75	75	75	73	73	73	73	73	73	73	73
3	75	77	77	75	75	75	77	75	75	73	73
4	77	79	81	81	81	81	82	79	77	75	75
5	81	82	86	84	84	84	84	82	81	79	77
6	84	86	88	88	86	88	88	84	84	81	77
7	86	90	91	90	90	90	90	86	86	82	79
8	90	91	93	93	91	93	91	88	88	84	81
9	91	93	97	95	93	95	93	90	90	86	81
10	93	97	100	99	97	99	97	91	91	86	82
11	95	99	104	102	100	102	100	93	93	88	82
12	97	100	108	106	104	108	104	97	93	88	84
13	97	102	111	111	111	113	109	100	97	90	84
14	100	104	115	117	117	118	115	104	99	91	86
15	102	108	120	122	122	126	120	108	102	93	86
16	106	111	126	126	126	131	126	111	108	95	90
17	109	115	129	129	131	136	131	117	111	100	91
18	115	118	133	133	135	142	138	122	118	106	95
19	122	124	135	138	140	149	145	131	124	111	99
20	129	131	140	145	147	160	154	138	131	117	102
21	136	138	147	156	158	171	165	147	138	120	106
22	144	147	160	167	171	185	180	158	145	127	109
23	153	156	174	180	183	199	194	169	156	133	113
24	162	167	189	194	198	214	208	183	171	142	118
25	172	180	205	208	212	230	226	199	185	149	122
26	185	194	223	226	230	248	246	217	203	158	127
27	198	208	241	246	248	266	266	239	223	174	133
28	214	226	261	266	268	286	288	262	246	190	140
29	234	248	282	289	288	306	313	291	275	210	149
30	253	271	306	313	307	327	340	324	311	235	160
31	277	295	329	336	331	351	369	360	351	262	172
32	300	322	356	361	354	376	399	401	394	295	187
33	334	354	385	390	383	406	442	498	558	367	207
34	369	388	417	424	419	448	507	657	721	486	239
35	403	426	451	459	459	493	601	826	793	554	273
36	444	466	487	496	496	540	691	900	846	590	302
37	507	523	532	541	532	583	741	901	883	622	327
38	561	585	601	639	579	630	788	925	912	653	351
39	606	644	675	721	630	676	835	934	930	680	376
40	653	702	732	754	680	718	871	932	932	700	396
41	700	754	775	779	725	756	900	936	936	716	415
42	745	795	813	806	763	786	928	943	936	729	432
43	783	831	846	833	792	815	954	946	936	738	446
44	819	871	880	864	815	846	979	954	937	745	459
45	856	919	925	894	838	878	997	963	939	752	469
46	896	970	972	932	864	909	1004	970	943	757	480
47	932	991	995	964	894	941	1004	982	952	765	491
48	963	1004	1004	981	930	972	1008	993	961	772	500
49	990	1018	1015	993	975	991	1015	1004	968	781	511
50	1017	1036	1026	1008	1008	999	1024	1017	975	790	520
51	1044	1058	1042	1022	1017	993	1035	1027	986	801	529

Time (min)	TC #58 (°F)	TC #59 (°F)	TC #60 (°F)	TC #61 (°F)	TC #62 (°F)	TC #63 (°F)	TC #64 (°F)	TC #65 (°F)	TC #66 (°F)	TC #67 (°F)	TC #68 (°F)
52	1067	1078	1060	1036	1018	990	1042	1033	991	811	541
53	1094	1099	1078	1049	1020	991	1051	1044	1002	822	550
54	1123	1121	1096	1062	1024	999	1062	1054	1009	833	561
55	1148	1141	1112	1071	1029	1006	1071	1062	1017	842	572
56	1173	1161	1130	1083	1035	1017	1081	1072	1026	855	583
57	1198	1180	1146	1096	1042	1029	1094	1083	1036	865	594
58	1220	1198	1161	1107	1047	1040	1105	1094	1045	876	604
59	1242	1216	1177	1117	1054	1053	1116	1103	1054	887	617
60	1260	1233	1193	1130	1062	1063	1128	1114	1067	900	630
Max Temp:	1260	1233	1193	1130	1062	1063	1128	1114	1067	900	630
Max Allowed:	397	398	397	397	397	397	397	397	398	398	398

Time (min)	TC #69 (°F)	TC #70 (°F)	TC #71 (°F)	TC #72 (°F)	TC #73 (°F)	TC #74 (°F)	TC #75 (°F)	TC #76 (°F)	TC #77 (°F)	TC #78 (°F)	TC #79 (°F)
0	73	73	72	72	72	72	72	72	72	72	72
1	73	73	73	73	72	72	73	73	72	72	73
2	73	75	75	73	73	72	73	73	73	73	73
3	73	75	77	75	73	73	75	73	73	73	75
4	73	75	79	79	75	73	75	77	75	73	77
5	75	77	81	81	79	75	79	79	79	75	79
6	75	77	82	82	81	77	81	81	81	77	81
7	75	79	84	84	82	79	82	84	82	79	82
8	77	79	86	86	84	81	84	86	86	81	86
9	77	81	88	88	86	82	86	88	88	84	88
10	77	81	90	91	88	84	90	90	90	86	90
11	79	82	93	95	91	88	91	93	93	88	93
12	79	84	97	99	95	90	95	97	97	91	99
13	79	86	100	102	99	93	100	102	102	97	102
14	79	86	104	106	102	99	104	106	108	100	108
15	81	90	108	109	108	102	109	111	111	106	113
16	81	91	111	113	111	108	113	117	117	111	118
17	82	93	117	118	117	113	118	120	122	117	124
18	82	95	120	122	122	117	124	126	126	122	129
19	84	97	124	126	126	122	129	129	131	127	133
20	84	100	127	129	129	126	133	135	133	131	136
21	86	102	131	133	135	129	136	138	136	135	142
22	88	104	133	138	136	133	140	140	140	138	149
23	90	104	136	144	140	136	144	145	147	140	158
24	91	106	140	151	145	140	151	153	154	142	167
25	93	108	145	158	149	144	160	162	163	144	176
26	95	108	153	167	158	147	169	172	172	153	189
27	97	108	160	178	165	154	180	185	185	162	201
28	100	109	169	187	176	163	192	198	198	172	216
29	102	109	176	198	187	172	205	212	212	185	230
30	106	111	185	208	198	183	217	228	226	198	246
31	109	115	194	219	208	194	232	244	243	212	262
32	115	118	205	232	219	205	246	262	261	226	280
33	120	122	216	246	234	217	262	279	279	241	300
34	129	127	226	261	248	232	279	297	297	257	318
35	138	133	239	275	264	246	297	316	316	275	340
36	149	138	250	289	280	261	313	334	336	293	360
37	156	144	262	304	297	277	331	352	356	311	381
38	165	149	275	320	313	293	349	372	376	331	405
39	172	156	288	336	329	309	370	394	397	351	428
40	180	162	300	352	347	327	390	417	421	370	451
41	189	167	313	369	363	345	412	439	444	394	477
42	196	172	325	383	381	363	435	460	468	415	502
43	201	180	338	399	399	383	455	484	489	439	529
44	208	185	351	415	417	401	477	505	513	462	554
45	216	190	363	430	435	421	496	527	536	486	581
46	221	196	378	446	453	441	518	547	558	511	606
47	226	203	388	460	471	460	538	568	579	534	633
48	232	208	403	478	489	478	558	590	603	559	660
49	237	216	417	493	507	498	577	612	626	583	685
50	243	223	432	509	523	518	597	633	648	608	709
51	250	228	444	523	541	536	617	653	669	633	732

Time (min)	TC #80 (°F)	TC #81 (°F)	TC #82 (°F)	TC #83 (°F)	TC #84 (°F)	TC #85 (°F)	TC #86 (°F)	TC #87 (°F)	TC #88 (°F)	TC #89 (°F)	TC #90 (°F)
0	73	73	72	72	72	72	72	72	72	73	73
1	75	73	73	73	75	73	73	73	75	75	79
2	75	73	75	73	75	75	73	75	77	79	82
3	77	73	77	75	77	77	73	77	79	81	82
4	79	73	79	79	79	79	75	81	81	82	82
5	82	73	82	82	82	81	75	82	82	82	82
6	84	73	84	84	84	81	77	82	84	84	82
7	86	73	86	86	86	82	79	84	84	84	84
8	88	73	90	88	88	84	79	86	86	86	84
9	90	75	91	91	90	86	81	88	88	88	86
10	93	75	95	93	93	88	82	90	90	90	88
11	97	75	99	97	97	91	84	93	91	91	90
12	102	75	102	102	100	95	86	95	95	95	91
13	108	75	108	106	104	99	90	99	99	99	95
14	111	75	111	111	108	102	93	104	102	102	97
15	117	75	117	115	113	106	95	108	106	106	100
16	122	75	122	120	117	111	100	111	111	108	104
17	126	75	126	124	122	115	104	115	113	111	108
18	131	75	129	127	126	118	108	118	117	115	111
19	136	75	133	133	133	122	111	120	122	118	115
20	140	75	138	140	140	126	115	126	127	124	120
21	144	75	145	149	147	133	118	133	135	129	126
22	151	75	154	160	158	140	122	140	142	136	131
23	160	75	165	172	169	147	124	151	149	144	138
24	172	75	180	185	181	156	126	160	160	153	145
25	185	75	196	201	198	167	129	172	169	162	154
26	199	75	212	217	212	178	138	185	181	172	163
27	214	75	230	235	230	190	145	198	194	183	172
28	230	75	248	255	248	205	156	212	208	194	183
29	246	77	268	275	266	219	165	226	221	205	194
30	264	77	289	295	284	234	176	241	235	217	205
31	284	77	309	316	304	248	187	255	248	230	217
32	302	77	333	338	324	264	199	270	262	243	230
33	322	77	354	360	345	280	212	284	277	257	243
34	343	77	378	383	365	297	226	300	291	271	257
35	365	77	403	406	387	315	239	315	306	288	270
36	388	77	426	430	408	331	253	331	322	302	284
37	412	77	451	453	432	349	268	347	338	318	298
38	437	79	477	477	453	367	282	363	354	334	313
39	462	79	502	502	477	385	298	379	370	351	327
40	487	79	527	525	498	405	313	397	388	367	342
41	514	79	552	549	522	424	329	414	406	385	358
42	540	79	579	574	543	442	347	432	424	403	374
43	568	81	606	597	567	462	363	451	444	421	390
44	595	79	633	622	590	482	381	469	462	439	406
45	624	79	660	648	613	502	399	487	480	455	423
46	651	79	685	671	637	523	417	507	498	473	439
47	678	79	711	694	658	545	437	527	516	491	455
48	705	81	734	716	682	567	457	549	536	509	471
49	730	81	757	738	703	588	480	568	556	527	486
50	754	81	779	759	725	612	502	590	576	545	502
51	777	81	799	781	747	633	522	610	594	565	518

Time (min)	TC #91 (°F)	TC #92 (°F)	TC #93 (°F)	TC #94 (°F)	TC #95 (°F)	TC #96 (°F)	TC #97 (°F)	TC #98 (°F)	TC #99 (°F)	TC #100 (°F)	TC #101 (°F)
0	73	72	73	72	72	72	72	72	73	73	72
1	79	81	73	73	73	72	72	73	73	73	72
2	84	86	73	73	73	73	72	73	73	73	72
3	82	84	73	77	75	73	73	73	75	75	73
4	82	82	75	81	79	77	73	77	77	77	73
5	82	81	75	82	81	79	75	79	81	79	75
6	82	81	77	84	82	81	77	81	82	82	77
7	82	81	77	86	84	82	79	82	84	84	79
8	84	82	77	86	86	84	82	86	86	86	81
9	84	82	79	88	88	86	84	88	90	88	82
10	86	84	79	91	91	90	86	90	91	91	86
11	88	86	81	93	93	91	90	93	95	95	88
12	90	88	81	99	97	95	93	97	99	99	91
13	91	90	82	100	100	99	97	100	104	104	97
14	95	91	84	106	106	104	100	106	108	108	100
15	97	95	86	111	111	108	104	109	113	113	106
16	100	97	88	115	115	113	109	115	117	118	111
17	104	100	90	118	120	117	115	120	122	124	117
18	108	104	91	122	124	122	118	126	127	127	122
19	111	108	93	126	127	126	124	129	131	133	127
20	117	111	95	129	131	129	127	133	136	136	133
21	122	115	97	131	135	133	131	136	140	138	136
22	127	118	99	135	140	138	135	140	144	144	140
23	135	122	100	138	147	144	138	145	154	151	142
24	142	126	102	144	154	151	142	153	163	158	144
25	149	131	102	151	160	158	144	162	176	169	145
26	156	136	104	158	171	167	149	171	187	178	151
27	165	144	104	169	183	176	158	183	201	190	162
28	174	151	106	178	198	187	167	196	217	205	171
29	185	158	109	190	210	199	176	208	234	219	181
30	194	167	113	201	225	212	187	225	252	235	194
31	205	174	117	214	237	226	199	241	271	253	208
32	216	183	120	226	253	243	212	259	291	271	223
33	226	190	124	239	270	259	226	277	313	291	237
34	239	201	127	252	284	275	241	297	334	311	253
35	250	208	133	264	300	291	257	316	356	331	270
36	262	217	136	279	316	309	275	336	378	352	288
37	275	226	140	291	334	327	291	358	401	374	306
38	288	237	145	306	352	347	309	379	424	396	324
39	300	246	151	318	365	363	329	399	446	417	343
40	313	257	154	333	381	379	345	421	466	441	365
41	325	266	160	345	396	396	365	441	487	464	387
42	340	277	165	360	412	412	383	462	509	487	408
43	352	288	169	374	426	430	401	482	531	511	432
44	367	298	174	387	442	448	421	502	552	532	455
45	381	309	180	401	459	464	441	523	574	556	478
46	394	318	185	414	473	482	459	543	595	577	504
47	406	331	190	428	489	500	478	563	617	601	527
48	421	342	196	442	504	518	498	583	639	624	550
49	433	351	201	459	520	536	518	603	658	648	576
50	448	361	208	471	534	554	536	624	678	669	599
51	464	374	214	486	550	572	556	644	696	691	626

Time (min)	TC #91 (°F)	TC #92 (°F)	TC #93 (°F)	TC #94 (°F)	TC #95 (°F)	TC #96 (°F)	TC #97 (°F)	TC #98 (°F)	TC #99 (°F)	TC #100 (°F)	TC #101 (°F)
52	477	385	219	500	565	588	576	662	714	711	653
53	487	399	226	513	579	606	594	680	730	730	682
54	500	410	232	527	595	624	613	698	748	750	711
55	511	421	237	543	612	640	635	712	763	768	738
56	523	430	246	558	626	658	658	729	781	784	763
57	536	441	252	572	640	676	682	745	793	801	786
58	547	450	257	588	655	694	700	759	811	820	811
59	559	459	264	604	669	712	721	774	829	840	837
60	570	466	270	619	684	730	743	786	846	860	860
Max Temp:	570	466	270	619	684	730	743	786	846	860	860
Max Allowed:	398	397	398	397	397	397	397	397	398	398	397

Time (min)	TC #102 (°F)	TC #103 (°F)	TC #104 (°F)	TC #105 (°F)	TC #106 (°F)	TC #107 (°F)	TC #108 (°F)	TC #109 (°F)	TC #110 (°F)	TC #111 (°F)
0	72	72	72	72	72	72	72	73	73	72
1	72	73	73	75	73	73	75	73	75	75
2	73	73	73	75	73	73	75	73	75	77
3	73	75	75	77	77	77	77	73	79	79
4	75	79	77	79	81	81	79	75	81	81
5	79	81	81	82	82	82	81	77	82	82
6	81	82	82	84	84	84	82	77	82	82
7	82	86	86	86	86	86	82	79	84	84
8	84	88	88	88	88	88	84	81	84	84
9	86	90	90	91	90	90	86	81	86	86
10	90	93	93	93	93	93	90	82	88	88
11	93	97	97	99	97	97	91	84	90	90
12	97	102	102	102	100	100	95	88	93	91
13	102	108	108	106	106	104	99	90	95	95
14	106	113	113	111	109	108	102	93	99	99
15	111	118	118	117	115	111	106	95	104	102
16	117	122	124	122	118	117	109	99	108	108
17	122	127	129	126	126	122	115	102	113	111
18	127	135	135	129	131	127	118	106	117	115
19	133	140	140	135	136	131	122	109	120	118
20	136	144	145	138	140	138	127	113	124	126
21	140	145	149	145	147	147	135	115	131	133
22	144	147	151	154	158	158	142	117	138	140
23	149	158	151	165	171	171	151	120	147	149
24	156	171	153	178	183	183	162	126	156	160
25	165	181	167	192	199	198	171	131	167	171
26	174	196	185	208	216	214	183	138	178	181
27	185	210	201	225	234	232	196	147	190	192
28	198	225	216	244	253	250	208	156	203	205
29	212	241	232	264	275	268	223	167	217	219
30	228	259	248	284	295	288	237	178	232	232
31	244	277	266	306	316	307	253	190	246	246
32	261	297	286	329	338	327	270	201	261	261
33	279	316	306	352	361	347	288	214	275	275
34	298	338	327	376	385	369	304	228	291	291
35	316	360	351	399	408	390	320	243	307	306
36	338	383	374	424	432	414	338	257	322	322
37	358	406	399	450	457	435	356	271	338	338
38	379	432	426	475	480	459	374	288	354	354
39	403	457	453	500	505	482	394	302	370	370
40	424	482	480	527	529	504	412	318	387	387
41	450	509	509	552	554	527	432	334	405	403
42	473	536	536	579	577	550	450	352	421	421
43	498	563	567	606	603	572	469	369	439	439
44	523	590	595	635	628	595	489	387	455	455
45	549	619	626	660	651	617	507	405	471	471
46	574	648	655	687	676	640	529	435	500	489
47	601	676	685	712	700	664	550	464	529	507
48	628	703	712	738	723	687	574	493	549	525
49	653	729	739	761	747	709	597	516	561	540
50	678	754	765	784	768	729	619	534	576	558
51	703	777	788	806	788	748	639	552	590	574

Time (min)	TC #102 (°F)	TC #103 (°F)	TC #104 (°F)	TC #105 (°F)	TC #106 (°F)	TC #107 (°F)	TC #108 (°F)	TC #109 (°F)	TC #110 (°F)	TC #111 (°F)
52	729	795	811	840	806	768	658	570	606	590
53	752	826	849	871	838	788	676	586	621	608
54	775	860	878	896	865	808	694	604	637	626
55	801	885	905	918	889	842	712	622	651	640
56	833	909	928	937	909	871	732	642	669	657
57	860	932	948	954	927	892	750	662	684	673
58	885	950	964	970	943	910	768	682	700	687
59	907	966	981	984	957	927	788	700	712	702
60	927	982	995	997	970	941	811	718	725	714
Max Temp:	927	982	995	997	970	941	811	718	725	714
Max Allowed:	397	397	397	397	397	397	397	398	398	397

Time (min)	TC #112 (°F)	TC #113 (°F)	TC #114 (°F)	TC #115 (°F)	TC #116 (°F)	TC #117 (°F)	TC #118 (°F)	TC #119 (°F)	TC #120 (°F)	TC #121 (°F)
0	72	72	72	72	73	72	72	72	73	72
1	77	79	79	79	73	73	73	73	73	73
2	79	82	82	82	73	73	73	73	73	73
3	82	82	81	79	73	77	77	77	77	75
4	82	82	81	79	75	81	81	81	81	79
5	82	82	81	79	75	82	84	84	84	82
6	82	82	81	79	77	84	86	86	88	84
7	84	82	81	79	77	86	86	88	90	86
8	84	82	81	81	79	88	88	90	91	90
9	86	82	82	81	79	90	91	91	95	91
10	86	84	82	82	81	93	93	93	97	93
11	88	86	86	84	82	97	97	97	100	97
12	91	90	88	86	82	100	100	100	104	100
13	95	93	90	88	84	104	104	104	108	104
14	99	95	93	90	86	108	108	108	113	109
15	102	99	95	93	88	111	111	113	118	113
16	106	104	99	95	90	115	117	118	124	117
17	109	108	104	99	91	118	120	122	127	122
18	115	111	108	102	93	122	126	127	133	126
19	118	115	111	106	95	126	131	133	138	133
20	126	120	115	109	97	129	136	140	145	140
21	131	126	120	111	99	131	140	145	154	147
22	138	133	126	115	100	133	144	154	165	156
23	147	140	133	120	100	135	149	162	176	167
24	156	147	138	124	100	142	162	172	187	176
25	167	156	147	129	102	149	172	183	198	189
26	176	165	154	135	106	160	185	194	210	201
27	189	176	163	142	109	172	198	208	226	216
28	201	187	172	149	113	183	212	223	244	232
29	214	198	183	158	118	196	225	239	264	248
30	228	208	192	165	124	207	241	257	284	266
31	241	221	203	172	127	219	255	277	306	286
32	255	234	214	181	133	232	273	297	329	306
33	271	246	225	190	138	244	289	316	349	327
34	288	261	237	199	144	259	306	334	370	347
35	302	275	248	208	149	273	322	354	392	369
36	318	289	261	216	154	288	340	374	414	388
37	334	304	271	225	162	304	358	392	435	410
38	351	318	284	234	169	322	376	412	455	432
39	367	333	295	241	176	340	396	432	475	453
40	385	347	307	252	183	356	414	450	495	475
41	401	363	320	261	192	372	432	468	514	496
42	417	379	334	273	199	387	450	486	532	518
43	435	396	349	284	207	403	466	504	552	540
44	453	410	361	293	214	419	484	522	570	561
45	469	426	372	300	219	433	502	540	590	581
46	486	441	385	309	226	450	518	556	608	603
47	504	455	397	315	234	466	536	574	626	622
48	522	473	412	329	241	482	552	592	646	644
49	536	487	423	333	250	496	568	608	664	662
50	552	502	435	342	259	511	585	626	682	682
51	570	518	450	352	264	527	601	644	698	700

Time (min)	TC #112 (°F)	TC #113 (°F)	TC #114 (°F)	TC #115 (°F)	TC #116 (°F)	TC #117 (°F)	TC #118 (°F)	TC #119 (°F)	TC #120 (°F)	TC #121 (°F)
52	586	532	460	363	271	540	617	658	714	720
53	604	549	475	370	279	556	633	676	730	736
54	621	563	487	378	286	570	648	693	747	752
55	637	579	500	390	293	586	664	709	761	768
56	655	597	516	408	302	603	680	723	777	784
57	671	613	531	421	309	619	698	741	792	801
58	685	628	545	433	316	635	714	757	808	817
59	700	642	558	442	325	651	729	774	824	833
60	712	653	567	446	333	666	743	790	840	851
Max Temp:	712	653	567	446	333	666	743	790	840	851
Max Allowed:	397	397	397	397	398	397	397	397	398	397

Time (min)	TC #122 (°F)	TC #123 (°F)	TC #124 (°F)	TC #125 (°F)	TC #126 (°F)	TC #127 (°F)	TC #128 (°F)	TC #129 (°F)	TC #130 (°F)	TC #131 (°F)
0	72	72	72	72	72	73	73	73	73	72
1	73	73	73	73	73	73	73	73	73	73
2	73	73	73	73	73	73	73	75	75	73
3	75	75	75	75	75	75	77	77	77	77
4	79	79	79	79	77	79	81	81	81	81
5	81	81	81	81	81	81	82	84	84	82
6	84	84	84	84	82	82	84	86	86	84
7	86	86	86	86	84	86	86	86	86	86
8	88	88	88	88	86	88	90	88	88	86
9	90	90	91	90	90	90	91	90	90	90
10	91	91	93	93	93	93	95	93	93	91
11	95	95	97	97	97	97	99	97	95	95
12	100	100	102	102	100	100	100	100	99	97
13	104	104	106	106	104	106	106	104	102	100
14	108	109	111	111	109	109	109	108	106	104
15	113	115	115	115	113	115	113	111	109	108
16	117	118	120	120	118	118	117	117	115	113
17	122	124	124	124	122	122	122	122	122	118
18	126	127	129	129	127	127	131	131	129	127
19	133	133	133	133	131	136	140	140	136	135
20	138	140	140	140	135	145	151	149	147	144
21	147	151	151	149	140	154	163	162	158	154
22	156	160	162	160	154	165	176	174	169	165
23	167	171	172	171	165	178	192	190	183	180
24	178	183	185	183	176	190	208	207	199	194
25	189	194	198	198	190	205	226	225	217	208
26	201	210	212	212	203	219	244	244	235	226
27	216	225	226	226	217	234	262	264	255	244
28	232	239	244	244	234	252	280	286	275	264
29	248	255	261	261	248	270	300	306	295	284
30	266	273	280	279	266	289	322	327	316	302
31	284	291	298	297	284	309	342	349	336	324
32	302	309	316	316	304	331	363	370	358	343
33	322	327	336	334	324	352	387	392	379	365
34	342	347	356	354	345	376	408	414	401	385
35	361	367	376	374	370	399	433	437	423	406
36	381	387	396	396	394	424	457	460	444	426
37	403	406	417	419	419	450	482	484	468	446
38	423	428	439	441	444	477	509	509	489	468
39	446	453	464	466	471	505	545	541	514	493
40	469	478	491	493	500	536	579	572	540	518
41	493	504	516	520	529	567	610	603	565	540
42	516	529	543	547	558	597	640	631	590	561
43	540	554	568	574	588	628	669	658	615	583
44	561	577	594	601	617	657	694	685	640	606
45	581	599	619	626	648	685	720	709	664	626
46	603	622	642	653	676	712	741	734	685	648
47	624	644	667	676	702	738	765	756	709	673
48	644	666	689	700	727	759	786	777	730	698
49	664	685	711	721	748	783	808	801	752	718
50	682	703	730	741	768	804	828	822	770	734
51	702	723	748	761	788	826	849	844	790	750

Time (min)	TC #122 (°F)	TC #123 (°F)	TC #124 (°F)	TC #125 (°F)	TC #126 (°F)	TC #127 (°F)	TC #128 (°F)	TC #129 (°F)	TC #130 (°F)	TC #131 (°F)
52	718	739	766	779	808	847	871	867	808	766
53	736	757	786	799	828	871	901	900	828	781
54	752	775	806	819	851	900	936	925	847	797
55	770	793	824	840	878	934	961	950	869	815
56	786	811	846	865	914	950	968	966	898	833
57	802	828	867	894	943	961	973	973	927	855
58	815	844	892	918	955	970	981	979	946	880
59	831	862	919	932	957	981	990	984	957	903
60	847	882	936	941	963	991	1002	993	961	921
Max Temp:	847	882	936	941	963	991	1002	993	961	921
Max Allowed:	397	397	397	397	397	398	398	398	398	397

Time (min)	TC #132 (°F)	TC #133 (°F)	TC #134 (°F)	TC #135 (°F)	TC #136 (°F)	TC #137 (°F)	TC #138 (°F)	TC #139 (°F)	TC #140 (°F)	TC #141 (°F)
0	72	72	72	72	72	72	73	73	73	72
1	73	73	73	73	75	77	77	73	73	72
2	73	75	75	77	79	81	82	73	73	73
3	77	77	79	82	82	82	84	73	77	79
4	81	81	82	84	84	84	84	73	81	82
5	82	82	84	86	84	84	84	75	82	86
6	84	84	86	88	84	84	84	75	82	88
7	86	84	86	88	86	84	86	75	84	90
8	86	86	86	90	86	86	86	75	84	90
9	88	88	90	90	88	86	88	75	84	91
10	91	90	91	93	90	90	90	75	86	95
11	93	93	95	97	93	93	93	75	86	97
12	97	97	99	100	99	97	95	75	88	100
13	100	100	102	106	102	100	99	75	90	104
14	104	104	108	111	106	104	102	75	90	108
15	108	108	111	115	111	108	106	75	91	111
16	113	113	117	120	117	113	109	75	93	115
17	118	120	122	124	122	118	113	75	95	120
18	126	126	129	127	127	124	115	75	97	124
19	133	135	136	131	135	129	118	75	100	126
20	144	144	144	136	140	136	120	77	102	129
21	153	154	153	140	149	144	124	77	104	133
22	165	165	162	147	158	153	129	77	108	136
23	178	176	172	156	167	162	136	77	109	142
24	192	190	185	169	178	172	149	79	111	145
25	208	205	199	183	190	183	160	79	115	149
26	225	221	214	196	205	196	169	79	117	154
27	243	237	228	210	217	208	180	81	118	160
28	261	253	244	226	232	223	190	81	120	163
29	279	270	261	243	248	235	203	81	124	169
30	297	288	279	262	262	250	214	81	126	174
31	315	304	295	282	279	264	225	82	127	180
32	331	322	313	302	295	279	237	82	131	187
33	349	340	333	322	311	293	248	84	133	192
34	367	358	351	342	327	307	259	84	136	199
35	385	376	370	361	343	322	271	86	140	207
36	403	394	390	381	361	338	284	86	144	216
37	421	412	408	401	378	352	297	88	147	225
38	441	432	428	419	396	369	309	90	153	234
39	460	450	448	439	412	383	320	91	158	244
40	480	469	468	459	430	399	333	91	162	255
41	500	489	489	478	448	415	345	99	180	277
42	522	511	511	496	466	433	360	109	201	320
43	541	532	532	518	484	450	374	104	196	318
44	561	554	550	538	504	468	387	129	221	345
45	583	574	570	558	522	484	399	149	217	345
46	612	594	590	576	540	500	414	118	219	356
47	644	613	610	597	558	516	428	111	223	367
48	666	637	631	617	574	532	441	111	228	378
49	684	660	653	639	594	549	455	113	234	387
50	698	682	675	658	613	565	469	115	237	396
51	712	700	693	678	633	583	484	115	243	406

Time (min)	TC #132 (°F)	TC #133 (°F)	TC #134 (°F)	TC #135 (°F)	TC #136 (°F)	TC #137 (°F)	TC #138 (°F)	TC #139 (°F)	TC #140 (°F)	TC #141 (°F)
52	727	716	709	696	651	599	498	117	246	414
53	741	732	725	712	669	615	513	118	252	424
54	754	745	739	729	685	631	525	118	255	432
55	766	759	754	743	702	648	540	120	261	441
56	781	774	766	756	714	662	554	122	266	450
57	797	788	781	766	725	675	567	124	270	457
58	813	802	793	779	736	685	577	126	275	466
59	829	817	808	792	747	696	590	126	279	475
60	847	831	820	804	759	707	601	127	284	482
Max Temp:	847	831	820	804	759	707	601	149	284	482
Max Allowed:	397	397	397	397	397	397	398	398	398	397

Time (min)	TC #142 (°F)	TC #143 (°F)	TC #144 (°F)	TC #145 (°F)	TC #146 (°F)	TC #147 (°F)	TC #148 (°F)	TC #149 (°F)	TC #150 (°F)
0	72	72	72	72	72	72	72	73	73
1	72	72	72	72	72	72	72	73	77
2	73	73	75	73	73	73	73	73	77
3	75	75	81	79	77	75	75	75	77
4	79	79	86	84	82	77	79	79	79
5	82	81	90	88	86	79	82	82	81
6	84	82	93	91	90	81	84	86	84
7	86	84	95	95	93	82	86	88	86
8	88	86	99	97	95	86	88	90	90
9	90	90	100	100	97	88	90	93	93
10	93	91	104	102	100	90	93	95	97
11	95	95	109	108	104	93	97	99	100
12	99	99	115	111	108	97	100	100	104
13	100	102	118	117	111	100	104	104	108
14	106	108	126	122	117	104	108	109	113
15	109	111	131	127	122	108	113	113	117
16	113	117	136	135	129	113	118	118	122
17	117	122	144	140	135	118	122	124	127
18	122	127	149	147	140	124	127	129	133
19	126	133	154	153	147	129	133	135	138
20	129	138	160	158	153	135	138	140	142
21	133	144	165	163	158	142	144	145	147
22	136	147	169	167	162	147	147	153	151
23	140	153	174	172	167	153	153	158	156
24	145	156	180	178	171	158	158	165	160
25	151	160	185	183	176	162	165	171	162
26	154	163	192	190	183	167	171	180	165
27	158	167	199	198	190	171	178	187	165
28	163	171	207	207	199	176	187	198	167
29	169	174	214	214	207	183	194	207	171
30	176	178	221	223	216	190	205	216	174
31	183	185	230	232	225	199	214	226	180
32	190	192	239	241	234	208	225	239	187
33	198	201	248	252	246	217	237	252	201
34	207	210	259	264	257	228	250	266	216
35	217	219	271	277	270	241	262	280	228
36	228	230	284	289	284	253	277	295	243
37	239	241	297	306	300	268	291	313	259
38	252	253	311	322	318	282	309	331	279
39	266	266	327	338	336	298	325	349	302
40	279	280	343	356	356	315	345	370	327
41	302	297	367	381	383	334	372	401	363
42	338	324	396	414	421	369	403	441	423
43	338	336	414	433	437	381	439	507	516
44	370	363	446	475	487	423	522	640	671
45	387	385	468	498	514	455	559	709	784
46	397	405	487	520	540	484	586	741	829
47	412	424	507	540	563	511	615	770	876
48	428	430	527	561	585	538	646	799	914
49	442	446	547	581	608	565	675	840	950
50	457	464	565	599	628	590	702	874	984
51	471	480	583	619	649	615	730	909	1015

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Time (min)	TC #151 (°F)	TC #152 (°F)	TC #153 (°F)	TC #154 (°F)	TC #155 (°F)	TC #156 (°F)	TC #157 (°F)	TC #158 (°F)	TC #159 (°F)	TC #160 (°F)
0	72	72	72	72	72	72	72	73	73	73
1	73	72	72	72	72	72	73	73	75	77
2	73	73	73	73	72	73	75	79	81	82
3	77	77	77	75	73	77	79	82	82	86
4	82	82	82	79	75	81	84	86	82	88
5	86	86	86	82	77	82	86	88	82	90
6	90	90	90	84	79	86	90	90	82	91
7	93	93	93	86	79	86	93	93	84	93
8	97	97	97	88	81	90	95	95	86	95
9	99	100	99	90	82	91	97	97	88	97
10	104	104	104	91	84	93	100	99	90	99
11	109	109	108	95	86	95	104	100	91	100
12	115	115	111	97	88	99	108	104	93	104
13	118	118	117	100	91	102	111	108	95	108
14	126	124	122	104	95	106	115	111	99	111
15	131	129	126	108	97	111	120	115	100	115
16	136	136	133	113	102	115	126	118	104	120
17	144	142	136	117	106	120	131	122	106	124
18	149	147	144	122	111	126	136	127	109	129
19	154	153	147	127	115	131	140	131	113	133
20	158	156	153	131	120	136	145	136	117	138
21	163	162	158	136	126	142	149	142	120	142
22	167	167	163	142	129	147	154	145	124	147
23	171	171	169	147	135	153	158	151	126	151
24	176	176	174	153	140	156	162	154	129	156
25	181	185	183	156	144	162	167	160	133	162
26	187	192	192	162	149	165	172	165	135	167
27	194	201	201	169	154	169	181	171	138	174
28	207	212	212	174	158	176	190	176	140	181
29	217	223	223	181	162	185	199	183	144	189
30	228	234	232	189	167	194	208	190	149	198
31	239	244	243	199	171	201	216	198	153	205
32	252	257	255	210	176	212	226	207	160	212
33	266	271	270	221	183	223	237	217	167	221
34	280	288	284	235	190	235	252	228	176	232
35	297	304	302	252	199	248	266	241	185	243
36	315	320	320	268	210	264	282	255	198	255
37	334	340	342	286	221	280	300	273	212	270
38	356	361	363	306	234	298	320	291	230	284
39	379	383	387	325	248	320	342	309	252	302
40	403	408	412	345	262	340	363	333	275	320
41	437	442	450	381	279	378	406	376	322	358
42	505	514	534	493	316	514	532	489	417	430
43	622	678	739	613	338	570	586	552	477	471
44	788	768	786	624	370	604	635	595	523	509
45	882	799	799	642	401	631	671	631	581	536
46	918	842	817	664	430	657	702	666	651	561
47	919	869	840	689	460	684	732	700	716	588
48	930	891	860	716	489	711	761	734	768	613
49	950	914	882	745	518	738	788	768	811	640
50	972	937	905	774	549	766	822	802	853	667
51	993	961	930	806	579	795	867	844	889	694

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Time (min)	TC #151 (°F)	TC #152 (°F)	TC #153 (°F)	TC #154 (°F)	TC #155 (°F)	TC #156 (°F)	TC #157 (°F)	TC #158 (°F)	TC #159 (°F)	TC #160 (°F)
52	1015	984	954	842	610	835	903	887	918	720
53	1035	1006	979	874	642	874	936	925	948	745
54	1054	1027	1000	905	675	909	966	959	977	774
55	1072	1047	1022	932	707	941	993	988	1004	804
56	1090	1067	1044	961	739	972	1015	1015	1029	846
57	1108	1087	1063	984	772	999	1036	1038	1054	885
58	1126	1105	1081	1008	804	1022	1056	1058	1076	919
59	1143	1121	1101	1029	837	1045	1076	1078	1098	950
60	1161	1137	1121	1049	867	1065	1090	1096	1116	975
Max Temp:	1161	1137	1121	1049	867	1065	1090	1096	1116	975
Max Allowed:	397	397	397	397	397	397	397	398	398	398

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Time (min)	TC #161 (°F)	TC #162 (°F)	TC #163 (°F)	TC #164 (°F)	TC #165 (°F)	TC #166 (°F)	TC #167 (°F)	TC #168 (°F)	TC #169 (°F)	TC #170 (°F)
0	72	73	72	73	73	72	73	73	73	73
1	77	73	73	73	73	73	73	73	73	73
2	84	73	75	75	75	75	73	73	75	73
3	86	73	81	81	79	79	79	81	81	75
4	86	73	84	86	82	82	86	86	86	77
5	86	73	86	90	86	84	91	91	91	79
6	88	73	88	91	90	88	95	97	95	82
7	88	75	90	93	91	90	99	100	99	84
8	90	75	91	97	93	93	102	102	100	86
9	90	75	93	99	97	97	106	106	106	90
10	93	75	97	102	100	102	111	111	111	93
11	95	75	100	108	106	108	117	117	117	95
12	97	75	102	113	109	113	124	124	124	100
13	100	75	106	118	115	120	131	131	131	104
14	104	77	109	124	120	126	138	138	138	108
15	108	77	113	129	126	133	147	145	145	113
16	111	77	118	135	133	140	154	154	153	120
17	115	77	120	140	138	147	162	162	160	126
18	118	79	126	147	144	154	169	169	167	133
19	122	79	129	151	149	160	174	176	172	138
20	126	79	133	156	154	167	181	183	180	145
21	129	81	136	162	160	172	189	192	189	153
22	133	82	140	167	165	178	199	203	198	160
23	136	82	144	174	171	183	208	214	207	165
24	140	82	147	183	180	192	219	225	217	172
25	144	84	151	190	189	203	230	237	230	178
26	147	84	154	201	198	212	241	250	241	185
27	153	86	160	210	208	223	255	264	253	194
28	156	86	163	221	219	234	270	279	268	205
29	162	86	171	232	232	244	284	295	282	216
30	167	86	176	244	244	255	298	309	297	226
31	171	88	183	255	259	268	315	327	313	239
32	176	88	189	268	271	280	331	343	329	253
33	183	90	194	279	288	295	349	361	347	268
34	190	90	201	291	302	309	367	381	367	284
35	198	91	208	304	318	324	385	401	387	300
36	207	93	214	316	334	340	405	423	408	320
37	216	93	219	329	352	356	424	444	432	338
38	226	95	226	342	370	374	446	468	457	360
39	237	95	234	354	388	392	468	491	482	381
40	250	97	237	367	406	410	489	514	509	406
41	279	97	248	385	428	430	514	547	554	442
42	333	100	261	406	451	451	543	581	603	493
43	365	102	271	421	471	473	568	610	637	532
44	390	118	291	442	514	500	599	640	669	581
45	408	226	464	590	601	599	736	698	759	626
46	423	129	315	495	561	549	662	702	736	649
47	439	133	313	496	574	572	676	725	770	693
48	455	151	325	509	603	604	700	752	799	739
49	473	165	324	522	626	617	721	777	829	768
50	489	117	331	536	631	635	745	799	862	804
51	509	113	338	550	649	658	766	828	894	844

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Time (min)	TC #161 (°F)	TC #162 (°F)	TC #163 (°F)	TC #164 (°F)	TC #165 (°F)	TC #166 (°F)	TC #167 (°F)	TC #168 (°F)	TC #169 (°F)	TC #170 (°F)
52	527	115	345	563	666	680	784	855	928	882
53	545	117	352	576	684	703	806	882	955	919
54	567	118	358	588	698	725	829	909	979	957
55	586	118	363	599	712	747	851	930	999	988
56	612	122	367	610	727	768	873	946	1013	1015
57	637	122	369	619	738	788	892	963	1027	1038
58	662	124	370	624	748	806	909	973	1040	1058
59	687	126	374	633	759	826	923	984	1051	1076
60	711	126	381	640	768	844	936	993	1060	1092
Max Temp:	711	226	464	640	768	844	936	993	1060	1092
Max Allowed:	397	398	397	398	398	397	398	398	398	398

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Time (min)	TC #171 (°F)	TC #172 (°F)	TC #173 (°F)	TC #174 (°F)	TC #175 (°F)	TC #176 (°F)	TC #177 (°F)	TC #178 (°F)	TC #179 (°F)	TC #180 (°F)
0	72	72	72	72	72	72	72	72	72	73
1	72	72	73	73	72	72	72	72	73	73
2	73	73	73	75	73	73	73	73	73	75
3	75	79	75	81	77	79	75	75	79	82
4	79	82	77	88	82	86	79	77	82	88
5	82	86	81	93	88	90	82	79	86	93
6	86	90	86	97	93	95	84	81	90	97
7	88	91	90	100	97	99	88	82	91	100
8	91	93	93	104	100	102	90	84	93	104
9	93	97	97	109	104	106	91	86	95	108
10	97	100	100	115	108	111	95	90	99	113
11	100	104	106	122	113	115	99	91	104	118
12	104	109	111	127	118	122	102	97	108	126
13	111	115	117	135	126	127	108	100	113	133
14	115	120	122	140	131	133	111	104	118	138
15	120	127	127	145	136	138	117	109	126	145
16	127	133	133	153	144	145	122	115	131	153
17	133	140	138	158	151	153	127	120	138	158
18	140	147	144	165	156	158	133	126	144	163
19	147	154	149	171	163	165	140	133	149	169
20	154	160	154	176	169	171	145	138	156	174
21	162	167	162	180	174	176	151	144	162	181
22	169	172	167	187	181	185	158	151	169	192
23	178	180	171	201	187	198	163	156	176	205
24	187	190	174	216	199	208	169	162	187	216
25	198	201	180	230	216	221	176	167	196	230
26	208	212	185	246	232	235	187	174	207	244
27	221	226	194	264	248	252	199	181	219	261
28	235	239	205	284	268	270	210	189	232	279
29	250	255	223	304	288	289	223	198	246	298
30	266	271	243	325	309	309	237	208	261	316
31	282	291	262	347	331	331	252	217	275	334
32	298	311	284	372	356	352	266	228	291	354
33	316	333	309	397	381	378	282	239	307	374
34	336	356	338	424	408	401	298	250	325	396
35	358	381	369	451	437	428	318	262	345	417
36	379	408	401	478	466	457	336	275	365	439
37	405	437	437	509	495	484	358	289	385	460
38	432	468	477	538	525	514	378	304	408	486
39	462	502	518	568	556	543	399	318	432	509
40	493	536	559	601	588	574	421	334	455	536
41	574	622	655	691	680	644	469	354	498	574
42	655	712	738	741	725	691	505	378	543	621
43	700	770	793	779	761	727	540	403	592	675
44	754	858	912	883	880	867	658	433	667	730
45	835	943	1000	973	986	981	720	478	739	779
46	925	997	1051	1015	1015	999	747	525	781	824
47	948	1038	1087	1042	1033	1009	774	565	822	882
48	979	1069	1116	1067	1051	1024	806	601	867	928
49	1008	1092	1135	1089	1069	1038	838	639	905	966
50	1036	1116	1155	1107	1087	1056	873	678	945	997
51	1062	1135	1175	1123	1103	1074	907	721	984	1024

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Time (min)	TC #181 (°F)	TC #182 (°F)	TC #183 (°F)	TC #184 (°F)	TC #185 (°F)	TC #186 (°F)	TC #187 (°F)	TC #188 (°F)	TC #189 (°F)	TC #190 (°F)
0	73	73	72	72	73	73	73	73	73	73
1	73	84	79	79	73	73	73	73	73	73
2	77	95	91	90	73	73	73	73	73	73
3	86	88	93	90	73	75	75	77	75	75
4	90	88	93	90	73	77	79	81	81	81
5	95	90	95	88	73	81	82	86	86	84
6	99	91	97	88	75	82	86	91	90	88
7	102	93	97	88	75	84	90	93	93	91
8	106	93	97	90	75	86	91	97	97	95
9	109	95	97	90	77	86	93	99	99	97
10	115	97	99	90	77	88	95	100	100	99
11	120	99	102	91	77	90	97	102	104	100
12	126	102	104	93	77	90	99	104	106	104
13	133	106	108	97	77	91	100	108	109	108
14	140	109	113	99	77	91	102	111	113	111
15	145	113	117	102	79	93	104	115	118	115
16	153	118	122	108	79	95	108	118	122	120
17	158	124	127	111	79	99	111	122	127	126
18	163	129	133	115	81	100	115	127	133	129
19	169	136	138	118	81	104	120	133	140	136
20	172	140	144	122	82	109	127	140	147	144
21	178	145	151	127	82	115	133	151	156	153
22	185	149	158	133	84	118	140	160	169	162
23	196	153	165	136	86	122	149	171	180	172
24	207	156	176	144	86	127	156	181	190	183
25	217	160	189	149	88	133	167	194	203	194
26	230	165	207	156	90	138	176	208	216	207
27	246	171	226	163	90	145	187	223	230	219
28	264	181	250	174	91	153	199	241	246	235
29	282	199	279	187	93	160	214	259	266	252
30	304	223	313	207	95	169	228	280	286	270
31	324	244	347	223	97	178	246	302	306	289
32	343	270	378	237	99	189	264	325	329	309
33	361	293	405	248	100	199	284	351	352	331
34	381	322	426	257	104	212	306	374	376	354
35	401	354	448	266	106	226	327	399	399	378
36	423	390	471	277	109	241	347	423	424	401
37	444	428	493	288	113	255	370	446	450	426
38	469	469	514	298	115	273	392	469	475	451
39	495	511	538	307	118	289	415	493	498	477
40	522	558	563	318	122	306	437	518	523	502
41	559	612	594	342	127	342	468	567	559	549
42	612	673	630	383	147	437	550	653	660	640
43	671	741	673	426	295	585	707	743	804	756
44	730	808	720	471	518	572	725	849	810	804
45	779	882	765	505	171	504	644	759	777	768
46	826	952	808	538	165	464	658	766	786	784
47	887	1002	860	568	167	475	673	779	801	801
48	939	1040	905	599	169	482	687	792	813	819
49	981	1067	941	630	171	491	700	806	828	838
50	1015	1092	973	660	172	498	711	819	846	862
51	1040	1114	1000	691	172	505	720	828	860	887

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Time (min)	TC #181 (°F)	TC #182 (°F)	TC #183 (°F)	TC #184 (°F)	TC #185 (°F)	TC #186 (°F)	TC #187 (°F)	TC #188 (°F)	TC #189 (°F)	TC #190 (°F)
52	1062	1134	1024	721	176	514	730	838	876	910
53	1080	1148	1042	752	180	522	741	851	894	934
54	1096	1162	1053	775	183	529	752	864	910	957
55	1112	1175	1065	795	185	536	765	874	921	963
56	1126	1188	1074	815	185	541	779	885	930	963
57	1141	1202	1087	835	187	550	792	892	932	961
58	1155	1213	1098	849	187	556	802	900	937	961
59	1168	1225	1110	864	189	561	813	907	941	963
60	1184	1240	1123	876	190	570	824	914	945	964
Max Temp:	1184	1240	1123	876	518	585	824	914	945	964
Max Allowed:	398	398	397	397	398	398	398	398	398	398

Time (min)	TC #191 (°F)	TC #192 (°F)	TC #193 (°F)	TC #194 (°F)	TC #195 (°F)	TC #196 (°F)	TC #197 (°F)	TC #198 (°F)	TC #199 (°F)	TC #200 (°F)
0	72	72	72	72	72	72	72	72	72	73
1	72	72	72	72	73	73	73	72	72	73
2	72	72	72	72	73	73	73	73	73	73
3	75	73	73	73	73	75	73	73	73	73
4	79	77	75	75	75	75	75	75	75	75
5	82	81	77	77	77	79	79	79	79	79
6	86	82	79	79	79	81	81	81	82	82
7	90	86	82	81	81	82	82	82	84	84
8	91	88	84	82	82	84	84	84	86	86
9	93	90	86	84	84	86	86	86	90	88
10	95	93	88	86	86	88	86	88	90	90
11	97	95	90	88	88	90	88	90	91	91
12	100	97	91	90	90	91	90	91	93	93
13	104	99	95	91	91	93	93	93	95	95
14	108	102	97	93	95	97	95	95	97	97
15	111	106	100	97	97	100	99	97	100	100
16	117	109	104	100	100	104	102	100	102	104
17	122	113	108	104	104	108	106	106	108	109
18	126	118	113	109	109	113	111	109	111	115
19	133	124	118	115	115	118	117	115	117	118
20	138	129	124	120	122	126	122	120	122	126
21	144	135	129	126	129	133	129	126	129	133
22	154	142	136	133	136	140	136	133	135	140
23	163	149	144	140	145	147	144	140	142	147
24	174	160	151	149	154	156	153	149	151	156
25	187	171	162	158	167	167	162	160	162	167
26	198	181	172	169	180	178	172	171	172	178
27	212	194	183	180	192	190	183	183	183	190
28	226	208	196	194	208	205	198	198	198	205
29	243	223	212	208	226	219	212	212	214	219
30	261	241	228	226	248	235	228	230	232	237
31	279	259	248	246	270	253	246	248	250	257
32	300	280	270	270	293	273	266	268	271	277
33	322	302	291	295	318	295	286	289	293	298
34	345	324	316	320	345	316	309	313	316	322
35	370	347	342	347	374	342	333	336	342	345
36	394	372	367	376	405	369	360	363	367	369
37	419	396	394	406	439	399	388	390	392	396
38	444	421	421	439	475	430	417	417	421	423
39	471	444	450	475	514	464	448	448	450	450
40	496	471	478	511	554	500	478	478	478	478
41	547	536	617	624	662	579	536	518	522	523
42	666	698	788	802	795	687	622	590	599	603
43	774	756	793	853	925	817	784	736	766	759
44	829	905	941	1045	1139	1134	1035	972	1022	963
45	799	824	883	1013	1139	1090	1047	1026	1047	1017
46	806	828	873	975	1087	1040	1004	1006	982	986
47	820	840	873	963	1069	1029	991	984	954	954
48	838	858	880	966	1074	1035	993	979	946	943
49	858	878	892	975	1085	1047	1002	986	950	948
50	878	898	909	991	1099	1062	1015	995	963	961
51	898	914	925	1011	1119	1080	1031	1009	977	975

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Time (min)	TC #201 (°F)	TC #202 (°F)	TC #203 (°F)	TC #204 (°F)	TC #205 (°F)	TC #206 (°F)	TC #207 (°F)	TC #208 (°F)	TC #209 (°F)	TC #210 (°F)
0	72	72	72	72	73	73	73	73	73	73
1	72	72	72	77	100	111	81	73	75	75
2	72	72	75	86	108	115	91	75	79	79
3	75	75	77	86	99	106	93	73	79	81
4	79	79	81	86	95	100	91	75	81	82
5	82	82	84	88	93	99	90	75	82	84
6	86	86	86	90	93	99	90	75	84	86
7	90	90	88	90	93	97	90	75	86	88
8	91	91	88	91	93	97	90	75	86	90
9	93	93	90	93	95	97	90	75	90	93
10	95	95	91	93	95	97	90	75	91	95
11	97	97	93	95	95	99	90	75	95	100
12	100	99	95	97	97	99	91	77	99	104
13	104	100	97	97	99	100	91	77	104	108
14	108	104	100	100	100	100	91	77	109	113
15	111	106	102	102	100	102	93	79	115	118
16	118	111	106	104	104	104	95	79	118	124
17	122	115	109	108	108	108	97	81	124	131
18	129	118	113	111	111	111	99	81	129	138
19	135	122	117	117	117	117	100	82	133	145
20	142	127	122	120	122	120	102	82	136	154
21	149	133	127	124	126	126	106	82	138	163
22	158	140	133	129	131	129	108	84	144	176
23	169	151	140	133	136	135	111	84	154	192
24	180	160	147	138	142	138	115	84	165	210
25	192	171	158	147	149	142	117	84	178	228
26	205	181	167	158	158	147	120	84	190	248
27	221	194	180	169	169	154	122	86	201	268
28	237	210	194	180	180	165	127	86	214	286
29	255	226	208	194	192	178	133	88	226	306
30	275	244	226	210	208	190	136	90	239	325
31	295	264	248	228	226	207	144	90	253	345
32	315	284	270	248	248	225	153	91	266	363
33	336	306	291	271	273	246	163	93	280	385
34	358	327	316	298	302	268	172	95	295	405
35	381	351	340	327	334	293	185	97	311	426
36	405	376	369	363	370	316	198	99	327	448
37	428	403	399	406	414	343	212	100	343	469
38	455	430	432	455	464	376	230	102	360	489
39	482	460	468	511	522	417	252	106	376	511
40	511	491	507	570	585	468	282	108	392	529
41	556	538	612	727	817	576	333	109	410	547
42	615	615	766	932	1031	768	439	111	426	567
43	781	797	999	1083	1121	918	549	115	441	585
44	934	939	1036	1107	1094	1008	637	115	455	604
45	968	1013	1026	1081	1074	1015	694	118	469	622
46	999	1022	1000	1065	1069	1004	734	120	484	637
47	1002	1002	991	1065	1072	997	763	124	498	655
48	999	990	995	1078	1087	1006	784	129	511	673
49	999	993	1006	1094	1107	1022	810	129	523	687
50	1006	1004	1022	1112	1126	1035	828	129	536	703
51	1017	1018	1040	1132	1146	1045	842	129	547	718

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Time (min)	TC #201 (°F)	TC #202 (°F)	TC #203 (°F)	TC #204 (°F)	TC #205 (°F)	TC #206 (°F)	TC #207 (°F)	TC #208 (°F)	TC #209 (°F)	TC #210 (°F)
52	1031	1033	1058	1152	1170	1062	851	131	558	732
53	1045	1049	1076	1173	1191	1080	858	133	570	747
54	1060	1065	1094	1193	1216	1098	867	135	583	761
55	1076	1081	1110	1213	1240	1119	880	140	595	774
56	1090	1098	1126	1231	1263	1139	896	140	608	788
57	1105	1112	1144	1247	1281	1155	912	140	619	804
58	1119	1128	1159	1263	1299	1170	927	142	630	820
59	1135	1143	1175	1279	1317	1184	945	144	640	838
60	1150	1159	1191	1294	1330	1197	968	145	651	853
Max Temp:	1150	1159	1191	1294	1330	1197	968	145	651	853
Max Allowed:	397	397	397	397	398	398	398	398	398	398

Time (min)	TC #211 (°F)	TC #212 (°F)	TC #213 (°F)	TC #214 (°F)	TC #215 (°F)	TC #216 (°F)	TC #217 (°F)	TC #218 (°F)	TC #219 (°F)	TC #220 (°F)
0	72	72	72	72	72	72	72	72	72	73
1	73	72	72	72	72	72	72	73	73	73
2	75	73	73	73	73	72	73	73	73	73
3	77	73	75	75	75	73	75	75	75	75
4	81	77	79	79	79	75	79	81	81	79
5	84	79	82	82	82	77	82	84	84	82
6	86	81	84	86	86	81	84	88	88	86
7	88	84	86	88	88	82	88	91	91	90
8	90	86	88	90	90	86	90	93	93	93
9	91	88	91	93	93	88	93	97	97	95
10	95	91	95	97	99	93	99	102	102	100
11	99	93	99	100	102	97	104	108	106	104
12	102	99	104	106	108	102	109	113	111	109
13	108	102	108	111	113	108	115	118	118	117
14	111	108	113	117	118	113	122	124	124	122
15	117	113	118	122	124	120	127	131	131	129
16	122	118	124	127	129	126	133	136	136	136
17	127	124	129	133	135	133	138	140	142	142
18	133	127	135	136	142	136	142	145	145	145
19	140	131	142	144	149	140	144	149	149	149
20	149	133	149	151	160	142	151	158	156	153
21	160	140	160	162	174	144	162	171	165	154
22	172	147	172	176	189	151	172	185	176	165
23	187	158	187	192	207	163	187	201	190	174
24	205	169	203	210	226	176	205	219	207	187
25	223	183	221	228	248	192	223	239	223	203
26	243	199	241	250	271	208	243	261	243	221
27	264	216	261	271	297	226	264	284	264	241
28	284	234	282	293	322	246	286	307	286	261
29	306	253	304	316	349	266	309	333	309	284
30	327	273	325	338	374	288	334	358	334	307
31	351	293	349	363	403	309	360	385	360	331
32	372	315	374	388	430	333	387	414	388	358
33	396	338	397	414	457	358	414	442	417	387
34	419	360	424	439	486	383	442	473	448	417
35	442	385	450	466	513	410	471	504	478	451
36	466	408	477	493	540	437	502	536	511	486
37	489	433	502	520	567	464	532	568	543	523
38	513	460	529	547	595	493	563	601	576	561
39	536	486	554	574	624	522	595	635	612	599
40	559	511	581	601	651	550	630	669	648	637
41	581	536	606	628	678	579	662	700	682	676
42	604	561	633	655	702	610	691	730	716	712
43	628	586	657	678	725	640	721	759	747	748
44	649	610	680	702	747	671	750	786	777	781
45	671	637	703	725	768	703	779	813	806	808
46	691	666	723	747	786	736	806	855	853	865
47	711	691	745	766	808	766	844	885	892	901
48	730	718	765	786	831	792	873	912	921	928
49	750	743	783	804	855	826	900	937	943	950
50	766	765	799	828	878	855	923	957	963	968
51	783	784	822	849	907	882	945	975	981	986

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Time (min)	TC #221 (°F)	TC #222 (°F)	TC #223 (°F)	TC #224 (°F)	TC #225 (°F)	TC #226 (°F)	TC #227 (°F)	TC #228 (°F)	TC #229 (°F)	TC #230 (°F)
0	72	72	72	72	72	72	72	72	72	73
1	72	72	72	72	75	77	79	91	79	86
2	72	73	73	72	77	81	84	108	86	91
3	75	75	75	73	81	84	86	100	86	86
4	81	81	81	75	82	86	88	97	84	84
5	84	86	82	77	86	86	88	95	84	82
6	88	90	86	79	86	88	90	95	84	82
7	90	93	88	81	88	90	90	93	84	82
8	93	95	90	82	88	90	91	93	84	82
9	97	99	93	84	91	93	93	93	86	82
10	100	102	97	86	93	95	95	95	88	84
11	106	108	100	88	97	97	97	97	90	86
12	111	113	106	91	99	100	100	99	91	88
13	117	118	111	95	104	104	104	100	93	93
14	122	126	118	99	108	109	109	104	99	97
15	129	131	126	104	113	113	115	109	102	100
16	135	136	133	108	118	118	120	113	108	106
17	140	142	138	115	124	124	126	118	113	111
18	145	145	144	118	129	129	129	122	117	111
19	149	149	149	124	135	136	135	127	122	117
20	149	154	151	129	142	142	140	131	126	120
21	156	165	154	133	149	151	147	136	131	126
22	167	180	162	135	162	162	158	142	136	127
23	178	194	169	136	172	174	169	147	142	127
24	194	212	185	140	185	187	180	154	149	129
25	212	232	203	147	201	201	192	163	158	133
26	234	253	221	156	217	217	207	176	169	144
27	255	277	241	167	234	234	221	190	178	153
28	279	302	261	180	253	252	237	205	189	162
29	304	327	282	192	273	270	255	219	201	172
30	329	356	304	207	295	291	273	234	214	185
31	358	383	325	223	316	311	293	250	226	198
32	387	412	349	239	338	333	313	268	241	207
33	417	442	370	255	360	354	333	286	257	219
34	448	471	396	273	383	378	354	306	273	234
35	480	502	419	291	406	401	376	327	289	248
36	513	532	444	311	428	424	397	349	306	261
37	545	563	469	331	453	448	421	374	324	275
38	579	594	496	352	478	473	444	397	343	289
39	615	626	523	374	504	498	469	423	363	306
40	649	658	550	397	529	522	493	448	381	320
41	684	689	579	421	554	547	518	471	401	336
42	716	720	606	444	579	572	543	496	421	351
43	748	748	635	468	606	599	567	522	441	365
44	779	775	662	493	631	624	594	547	460	378
45	804	799	689	516	658	651	619	572	478	392
46	846	835	714	541	682	675	644	597	496	408
47	880	867	739	567	707	700	669	622	516	424
48	909	894	765	592	730	721	694	648	534	441
49	934	919	793	619	754	743	716	673	552	455
50	954	941	824	646	775	765	738	696	570	471
51	973	959	855	673	797	784	759	718	588	486

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Time (min)	TC #231 (°F)	TC #232 (°F)	TC #233 (°F)	TC #234 (°F)	TC #235 (°F)	TC #236 (°F)	TC #237 (°F)	TC #238 (°F)	TC #239 (°F)	TC #240 (°F)
0	72	72	72	72	72	72	72	72	72	73
1	73	73	73	73	72	72	72	73	72	73
2	73	77	77	75	73	73	73	73	73	73
3	73	79	79	77	73	75	75	75	73	75
4	73	81	81	79	75	79	79	79	75	79
5	73	82	84	81	79	81	82	82	79	82
6	75	84	86	84	81	82	84	84	81	86
7	75	84	88	86	82	84	86	88	84	90
8	75	86	88	88	84	88	90	90	86	91
9	75	88	91	90	86	90	91	91	90	95
10	75	90	93	91	88	93	95	95	91	99
11	75	93	97	95	91	95	99	99	95	102
12	77	97	100	100	95	100	102	104	100	108
13	77	100	106	104	99	104	108	109	104	113
14	77	106	111	109	104	109	113	115	111	120
15	79	111	117	117	109	117	118	120	117	126
16	79	115	122	122	115	122	124	126	124	133
17	81	120	127	127	120	127	129	131	131	140
18	81	124	131	133	126	133	135	136	136	144
19	82	127	133	136	131	138	138	142	142	147
20	84	129	135	138	135	140	142	144	145	149
21	84	129	138	140	138	145	151	151	147	153
22	84	129	144	144	140	153	162	162	151	162
23	86	129	158	158	144	162	174	172	153	174
24	86	131	171	171	151	176	187	185	154	187
25	86	133	185	187	160	192	203	201	165	201
26	86	140	201	205	172	210	223	219	178	219
27	86	153	219	225	187	228	243	239	194	239
28	88	165	239	244	203	248	262	259	210	261
29	90	176	257	264	216	271	286	280	228	284
30	90	189	275	286	235	293	309	304	248	309
31	91	199	293	306	255	316	334	327	270	333
32	93	210	309	327	277	340	358	352	291	360
33	95	221	329	349	298	363	383	376	315	387
34	97	234	345	370	320	387	408	401	340	415
35	99	244	363	392	342	412	433	428	365	444
36	100	257	381	414	363	435	459	453	392	473
37	104	270	399	435	387	460	484	480	421	504
38	106	284	419	459	410	484	509	507	448	534
39	108	297	439	478	433	507	532	532	477	567
40	109	309	460	500	457	529	556	559	505	599
41	111	324	482	520	480	550	579	586	536	631
42	115	338	502	540	504	572	603	613	565	664
43	117	351	520	559	525	594	628	640	595	694
44	118	367	540	581	547	617	651	666	624	723
45	122	383	559	603	570	640	675	691	657	752
46	124	399	583	624	594	662	694	716	689	781
47	127	414	604	646	617	685	716	739	723	813
48	136	432	626	667	642	707	736	761	756	851
49	138	448	649	689	667	727	754	781	786	880
50	136	464	671	709	691	747	772	801	813	907
51	136	475	691	729	714	766	786	824	842	928

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Time (min)	TC #241 (°F)	TC #242 (°F)	TC #243 (°F)	TC #244 (°F)	TC #245 (°F)	TC #246 (°F)	TC #247 (°F)	TC #248 (°F)	TC #249 (°F)	TC #250 (°F)
0	73	73	73	73	73	72	72	73	73	75
1	73	75	73	73	73	73	73	75	77	82
2	73	75	73	73	73	73	73	77	82	86
3	77	77	75	77	77	77	75	82	86	90
4	81	81	79	81	81	79	75	84	86	90
5	84	84	82	84	86	82	79	86	88	90
6	88	88	86	88	90	86	79	88	90	90
7	90	91	90	91	91	88	81	88	90	91
8	93	93	93	93	93	90	82	90	91	91
9	97	97	97	97	97	91	84	91	93	93
10	100	100	100	100	100	95	86	93	95	95
11	104	106	104	104	104	99	90	97	97	97
12	109	109	109	109	109	102	93	100	100	100
13	115	115	115	117	115	108	97	104	106	106
14	120	122	122	122	120	113	100	108	109	109
15	127	127	129	129	127	118	104	113	113	113
16	133	135	135	135	135	126	111	118	118	118
17	140	140	142	142	140	133	113	124	124	122
18	144	145	145	147	145	138	118	131	129	129
19	147	151	149	153	149	144	126	136	136	135
20	151	154	154	156	154	147	133	140	140	140
21	162	158	156	160	158	149	138	144	145	145
22	172	165	156	163	165	149	142	151	153	153
23	187	178	163	167	176	153	145	160	163	160
24	203	194	174	181	190	165	149	171	176	172
25	221	212	187	198	207	178	153	183	189	185
26	241	230	205	217	225	192	158	198	203	199
27	264	252	226	237	244	207	163	214	217	214
28	288	273	248	259	266	225	172	230	234	230
29	315	297	270	282	288	241	183	248	252	246
30	342	320	293	307	313	261	194	266	270	264
31	369	343	318	334	336	280	207	286	288	282
32	397	370	343	361	361	300	219	306	307	302
33	426	397	369	392	388	322	235	325	329	322
34	453	424	396	421	417	345	252	347	351	343
35	484	453	426	451	446	367	268	370	374	365
36	514	484	455	482	475	392	286	392	397	388
37	545	514	487	514	507	419	304	417	421	410
38	576	547	522	547	538	446	324	442	446	435
39	608	579	556	583	570	475	343	468	471	459
40	639	612	592	617	604	504	363	493	496	482
41	669	646	630	653	637	532	385	518	522	507
42	700	680	666	687	671	563	406	543	547	531
43	729	712	702	720	702	592	430	568	572	554
44	754	745	736	750	732	622	453	595	597	579
45	783	775	770	781	761	651	477	622	624	604
46	810	815	804	806	788	680	502	649	649	630
47	858	882	871	847	817	707	525	676	675	655
48	891	909	903	880	858	732	550	702	696	678
49	918	930	927	909	889	759	577	727	720	702
50	941	946	946	934	914	792	603	750	741	721
51	961	963	964	954	937	824	630	772	761	743

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Time (min)	TC #241 (°F)	TC #242 (°F)	TC #243 (°F)	TC #244 (°F)	TC #245 (°F)	TC #246 (°F)	TC #247 (°F)	TC #248 (°F)	TC #249 (°F)	TC #250 (°F)
52	979	979	981	973	957	855	655	792	781	761
53	993	997	999	991	975	882	682	819	799	781
54	1006	1013	1015	1008	993	907	709	851	829	799
55	1020	1029	1031	1024	1009	928	734	873	856	824
56	1035	1044	1045	1038	1026	946	761	892	876	847
57	1049	1058	1060	1053	1040	964	786	910	894	865
58	1063	1072	1074	1067	1053	982	813	923	910	882
59	1076	1085	1087	1080	1067	999	838	936	923	896
60	1089	1098	1101	1092	1080	1015	864	948	937	909
Max Temp:	1089	1098	1101	1092	1080	1015	864	948	937	909
Max Allowed:	398	398	398	398	398	397	397	398	398	400

Time (min)	TC #251 (°F)	TC #252 (°F)	TC #253 (°F)	TC #254 (°F)	TC #255 (°F)	TC #256 (°F)	TC #257 (°F)	TC #258 (°F)	TC #259 (°F)	TC #260 (°F)
0	72	72	72	73	73	72	72	73	73	73
1	97	77	79	73	77	73	73	73	73	73
2	104	84	86	75	82	79	77	79	75	75
3	95	86	86	75	82	82	84	84	81	81
4	90	84	84	77	84	86	90	90	84	84
5	88	86	84	77	86	90	93	95	88	86
6	86	86	86	79	90	93	95	97	91	90
7	88	86	86	79	90	95	97	99	93	91
8	88	88	86	81	91	97	100	102	95	93
9	90	90	88	81	95	99	104	106	99	97
10	91	91	90	82	97	104	109	111	104	100
11	93	93	93	82	100	108	115	117	108	104
12	97	97	97	84	104	113	120	122	113	109
13	100	100	100	86	109	118	126	129	118	115
14	104	104	102	88	115	124	133	136	126	120
15	108	108	108	90	120	129	138	144	133	126
16	111	113	111	91	126	135	145	151	140	133
17	117	117	117	93	131	140	154	162	151	142
18	124	124	124	95	133	145	165	176	162	151
19	127	129	127	97	136	153	176	190	174	162
20	133	133	133	99	140	163	189	205	187	176
21	133	135	133	100	153	181	207	221	203	190
22	138	138	135	104	167	201	226	243	223	208
23	145	145	136	108	183	223	252	266	244	228
24	156	156	140	113	199	246	279	295	271	252
25	169	167	151	118	219	271	307	324	298	279
26	181	180	162	126	235	298	336	352	327	307
27	196	192	172	131	253	324	365	383	354	336
28	210	205	183	136	271	351	396	412	383	365
29	225	217	196	144	291	376	424	441	412	394
30	241	232	208	151	309	403	451	469	439	424
31	257	246	221	156	329	430	480	496	466	451
32	273	262	234	163	349	457	507	523	493	480
33	291	279	248	169	369	482	532	549	520	507
34	311	297	262	176	388	509	558	576	545	534
35	331	315	277	183	408	534	585	601	572	561
36	352	331	291	189	428	561	612	626	599	588
37	374	349	306	196	450	586	637	651	626	615
38	396	369	320	203	471	612	662	676	651	642
39	421	387	336	208	493	637	685	700	678	669
40	444	405	351	217	514	662	709	723	703	694
41	468	424	367	226	538	685	732	747	727	720
42	491	444	385	234	561	709	752	766	750	741
43	514	462	399	243	577	730	772	788	770	765
44	538	480	417	250	597	750	795	808	792	784
45	561	498	432	255	615	770	819	828	811	806
46	583	514	444	262	633	788	840	846	829	826
47	606	532	460	268	651	808	856	865	847	844
48	628	549	475	273	666	826	874	916	871	864
49	651	565	489	280	685	844	894	925	896	891
50	673	581	500	286	702	860	907	930	918	918
51	694	597	514	293	716	876	921	936	932	934

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Time (min)	TC #251 (°F)	TC #252 (°F)	TC #253 (°F)	TC #254 (°F)	TC #255 (°F)	TC #256 (°F)	TC #257 (°F)	TC #258 (°F)	TC #259 (°F)	TC #260 (°F)
52	712	612	527	302	732	892	934	945	941	943
53	732	626	538	307	747	905	943	955	952	952
54	750	642	550	309	761	914	952	964	963	963
55	766	655	558	313	775	925	959	975	973	975
56	784	666	572	316	784	934	970	986	986	986
57	808	680	594	322	797	945	979	997	999	1000
58	833	694	617	325	808	955	990	1008	1009	1011
59	853	709	635	329	820	966	1000	1018	1020	1026
60	869	721	653	333	831	977	1009	1029	1033	1036
Max Temp:	869	721	653	333	831	977	1009	1029	1033	1036
Max Allowed:	397	397	397	398	398	397	397	398	398	398

Time (min)	TC #261 (°F)	TC #262 (°F)	TC #263 (°F)	TC #264 (°F)	TC #265 (°F)	TC #266 (°F)	TC #267 (°F)	TC #268 (°F)	TC #269 (°F)	TC #270 (°F)
0	72	72	72	72	73	73	73	73	73	73
1	72	72	73	73	73	73	73	73	73	73
2	73	73	73	73	73	73	73	75	75	75
3	77	77	77	77	75	77	77	79	79	79
4	81	81	82	81	79	81	82	82	82	84
5	84	84	86	84	82	84	86	86	88	88
6	86	86	88	86	86	88	90	90	90	91
7	90	90	90	90	90	90	91	91	91	93
8	91	91	91	91	91	93	93	93	93	95
9	93	93	95	95	95	99	97	97	97	97
10	97	97	99	99	100	100	100	100	100	100
11	102	102	102	104	104	106	104	104	104	106
12	108	108	108	108	109	111	109	109	108	109
13	111	111	113	113	115	117	115	113	111	115
14	118	118	118	118	122	122	118	118	117	118
15	124	124	126	124	127	129	124	124	122	124
16	129	129	131	129	135	135	129	131	127	131
17	136	138	138	136	140	144	136	136	133	140
18	147	149	149	147	147	153	147	145	142	149
19	156	160	163	156	154	163	162	160	154	160
20	169	174	180	171	169	180	176	174	169	172
21	185	190	198	185	187	196	192	192	183	189
22	201	208	219	203	203	216	212	210	199	207
23	219	228	241	223	223	237	232	230	217	225
24	243	252	266	244	246	262	255	253	239	244
25	266	275	282	266	270	286	279	277	261	268
26	293	298	302	289	297	313	304	302	284	289
27	320	324	324	313	324	340	329	327	307	313
28	347	349	349	338	352	369	356	354	333	338
29	376	378	376	367	381	397	383	381	358	363
30	405	405	405	396	412	428	410	408	385	388
31	433	432	432	424	442	457	439	435	410	414
32	462	460	462	455	475	487	468	462	437	441
33	491	489	493	486	507	518	496	489	464	468
34	518	518	520	516	540	550	527	518	491	495
35	547	547	549	549	572	585	558	547	522	522
36	576	576	577	579	606	619	590	577	550	550
37	603	604	608	612	640	651	621	608	581	579
38	631	633	640	646	675	685	655	640	612	610
39	658	664	671	678	707	716	687	673	644	640
40	684	691	700	711	738	745	720	703	676	669
41	711	718	729	739	765	774	748	734	705	696
42	734	743	756	766	790	801	775	761	730	721
43	756	766	781	793	815	826	802	784	756	747
44	779	790	806	819	840	849	828	811	779	768
45	801	813	829	844	865	873	853	835	799	790
46	820	835	853	869	896	903	878	864	824	811
47	840	858	880	903	936	936	912	887	846	835
48	862	883	912	946	961	957	950	925	869	860
49	885	914	946	968	970	972	970	954	900	889
50	914	937	961	968	975	982	973	970	937	921
51	936	950	966	972	986	993	981	979	957	968

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Time (min)	TC #261 (°F)	TC #262 (°F)	TC #263 (°F)	TC #264 (°F)	TC #265 (°F)	TC #266 (°F)	TC #267 (°F)	TC #268 (°F)	TC #269 (°F)	TC #270 (°F)
52	945	961	972	981	999	1008	991	984	959	1004
53	954	970	982	993	1013	1022	1006	991	963	1011
54	964	982	995	1008	1027	1038	1020	1004	972	999
55	977	995	1009	1022	1044	1053	1035	1015	981	988
56	991	1008	1024	1036	1056	1065	1047	1029	991	988
57	1004	1022	1036	1049	1071	1080	1062	1042	1004	995
58	1017	1033	1047	1062	1083	1092	1072	1054	1015	1004
59	1031	1045	1060	1074	1096	1105	1085	1065	1026	1015
60	1042	1058	1072	1087	1108	1117	1098	1076	1036	1026
Max Temp:	1042	1058	1072	1087	1108	1117	1098	1076	1036	1026
Max Allowed:	397	397	397	397	398	398	398	398	398	398

Time (min)	TC #271 (°F)	TC #272 (°F)	TC #273 (°F)	TC #274 (°F)	TC #275 (°F)	TC #276 (°F)	TC #277 (°F)	TC #278 (°F)	TC #279 (°F)	TC #280 (°F)
0	72	72	72	73	73	73	72	73	73	73
1	75	79	79	79	84	79	72	73	73	73
2	81	84	84	86	91	86	73	73	73	73
3	82	86	88	90	91	88	77	77	75	77
4	86	88	88	90	93	90	81	81	77	81
5	88	90	90	91	93	90	86	86	79	84
6	91	91	91	93	95	91	90	90	82	88
7	93	93	93	95	97	91	95	93	86	90
8	95	93	95	97	99	93	99	97	88	93
9	99	97	97	99	100	93	100	100	91	97
10	102	100	100	100	102	95	106	106	97	100
11	106	104	104	104	108	99	111	111	100	104
12	109	108	108	108	111	100	117	117	106	109
13	115	113	111	113	117	104	124	124	111	117
14	118	117	117	118	122	106	131	131	118	122
15	124	122	122	124	127	111	138	138	126	131
16	129	127	127	129	133	115	147	147	133	144
17	136	133	133	133	136	120	154	154	142	160
18	145	136	136	140	140	120	163	162	149	172
19	154	142	142	144	145	122	171	169	162	185
20	165	151	147	151	147	122	178	176	171	198
21	181	163	156	158	151	126	187	187	178	210
22	198	178	171	171	163	126	199	198	183	219
23	216	192	187	187	180	129	210	210	190	228
24	235	208	207	205	196	136	225	221	198	234
25	257	226	225	225	212	147	237	234	205	243
26	280	246	244	244	230	156	253	248	214	253
27	306	266	266	266	250	167	273	262	223	266
28	329	288	288	288	268	178	295	280	234	279
29	356	311	309	309	288	190	318	300	248	293
30	383	334	331	331	306	201	342	320	262	307
31	410	361	356	354	327	214	367	342	280	324
32	439	390	381	378	345	226	392	363	300	343
33	469	417	406	401	367	241	417	387	322	363
34	500	446	432	424	387	255	444	410	345	385
35	532	477	459	448	408	271	469	433	372	408
36	565	507	487	475	432	288	495	459	401	433
37	595	536	516	500	455	306	520	484	432	460
38	626	568	547	529	482	324	545	511	462	487
39	657	599	574	556	507	343	570	536	493	516
40	685	630	604	583	532	361	597	565	525	545
41	712	662	635	613	558	383	626	594	561	577
42	738	693	666	644	585	403	657	624	595	610
43	763	721	694	673	612	424	687	657	631	644
44	784	747	720	702	640	446	721	689	669	678
45	808	770	743	725	664	468	754	723	707	714
46	829	790	765	748	687	491	786	757	745	750
47	855	811	784	766	709	514	819	792	783	788
48	882	833	804	786	729	536	853	828	820	824
49	909	855	822	804	745	554	891	864	860	864
50	936	880	844	824	763	572	930	907	903	907
51	966	910	865	844	783	592	968	948	946	948

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Time (min)	TC #271 (°F)	TC #272 (°F)	TC #273 (°F)	TC #274 (°F)	TC #275 (°F)	TC #276 (°F)	TC #277 (°F)	TC #278 (°F)	TC #279 (°F)	TC #280 (°F)
52	988	950	891	867	802	610	1006	990	990	991
53	993	970	923	892	822	628	1042	1029	1033	1035
54	990	970	941	921	842	646	1078	1069	1074	1074
55	990	964	945	950	865	664	1114	1107	1112	1114
56	995	968	950	968	892	680	1148	1143	1150	1152
57	1004	975	955	970	918	698	1182	1177	1184	1186
58	1013	986	964	964	925	716	1215	1209	1218	1220
59	1026	997	972	963	925	734	1243	1240	1251	1252
60	1036	1008	982	966	928	750	1272	1269	1281	1283
Max Temp:	1036	1008	982	970	928	750	1272	1269	1281	1283
Max Allowed:	397	397	397	398	398	398	397	398	398	398

Time (min)	TC #281 (°F)	TC #282 (°F)	TC #283 (°F)	TC #284 (°F)	TC #285 (°F)	TC #286 (°F)	TC #287 (°F)	TC #288 (°F)	TC #289 (°F)	TC #290 (°F)
0	72	72	72	72	72	72	72	72	72	73
1	72	72	72	72	72	72	72	72	72	73
2	72	72	72	72	72	72	73	73	73	73
3	73	73	73	73	73	73	77	79	75	75
4	77	75	75	75	75	75	81	84	81	79
5	81	79	79	81	79	79	86	88	86	82
6	84	81	82	84	82	82	91	91	90	86
7	88	84	86	88	86	86	97	95	93	90
8	91	86	90	91	90	90	100	99	99	93
9	93	90	93	95	93	93	104	102	102	97
10	97	93	97	100	97	97	109	106	106	100
11	102	97	100	104	100	102	115	109	111	104
12	106	100	106	109	104	106	120	115	117	109
13	111	106	111	115	109	111	127	120	122	115
14	118	111	117	120	115	117	135	127	129	120
15	126	118	124	127	122	124	144	135	136	127
16	133	126	131	135	129	131	151	144	144	135
17	140	133	140	144	136	138	158	151	151	144
18	149	142	147	151	144	145	165	158	158	151
19	156	151	156	158	153	154	171	167	165	158
20	165	158	165	165	162	162	174	174	171	165
21	172	167	174	171	169	169	181	180	178	172
22	180	174	180	176	176	176	196	187	187	178
23	187	180	187	185	181	181	208	192	198	189
24	198	187	194	194	190	190	219	199	208	198
25	208	196	205	203	201	201	234	212	221	208
26	221	208	216	212	212	212	252	223	234	219
27	234	221	228	225	223	223	271	237	246	230
28	248	234	243	237	235	237	295	253	262	243
29	264	248	257	253	250	252	320	271	280	259
30	282	266	275	271	266	268	345	291	302	275
31	302	284	293	293	284	288	372	313	324	295
32	324	304	315	316	306	309	399	336	349	316
33	349	325	336	343	327	333	428	361	374	338
34	374	349	361	374	352	358	457	387	399	363
35	399	374	388	405	378	385	486	414	426	388
36	428	401	417	435	406	412	514	442	453	415
37	457	428	448	468	435	442	543	471	482	444
38	486	457	478	500	464	471	572	500	511	475
39	516	487	513	532	495	504	601	529	540	505
40	547	518	545	567	525	536	630	561	570	538
41	579	550	579	603	558	568	658	594	601	570
42	612	585	615	640	590	603	689	628	633	606
43	646	619	651	678	626	639	721	664	667	642
44	682	655	687	718	662	675	756	700	702	680
45	718	691	721	757	698	711	788	738	736	720
46	752	725	757	799	734	747	819	775	770	757
47	788	761	793	842	772	783	851	811	804	797
48	824	799	828	892	811	820	883	849	840	835
49	862	838	865	937	851	858	918	887	878	876
50	903	882	909	977	896	901	955	928	919	921
51	946	925	952	1015	943	946	991	972	959	964

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Time (min)	TC #291 (°F)	TC #292 (°F)	TC #293 (°F)	TC #294 (°F)	TC #295 (°F)	TC #296 (°F)	TC #297 (°F)	TC #298 (°F)	TC #299 (°F)	TC #300 (°F)
0	72	72	72	72	72	72	72	72	72	73
1	72	72	72	72	72	72	72	72	72	73
2	72	72	72	72	72	72	72	72	72	73
3	72	72	73	73	73	73	72	73	73	75
4	72	72	77	75	75	75	73	75	75	79
5	72	73	81	81	81	79	75	77	77	84
6	73	75	84	84	86	82	79	81	81	88
7	73	77	86	90	90	86	82	84	84	93
8	73	79	90	93	95	91	86	88	90	100
9	75	81	95	99	100	97	90	93	95	108
10	75	82	99	102	106	102	95	99	100	115
11	75	84	104	108	113	108	100	104	108	124
12	77	88	111	115	118	115	106	111	115	133
13	79	90	117	122	126	122	113	118	124	140
14	79	93	122	127	133	127	118	126	133	149
15	81	97	127	133	140	135	126	133	142	156
16	82	100	133	140	147	142	133	138	149	162
17	84	104	138	145	154	147	140	145	156	169
18	86	108	144	149	158	153	147	153	162	172
19	88	109	147	154	163	158	153	158	167	176
20	90	113	149	158	167	162	158	163	172	180
21	91	115	153	160	169	167	163	169	176	183
22	93	118	154	163	172	171	167	172	181	189
23	93	120	156	167	174	174	171	178	189	199
24	95	122	158	169	176	176	174	183	199	219
25	97	126	162	174	178	180	180	192	212	244
26	99	127	167	180	181	183	183	207	226	273
27	100	133	174	187	185	190	190	223	248	307
28	102	136	185	196	190	203	199	241	284	345
29	106	144	201	208	203	219	212	266	313	385
30	108	151	219	225	223	235	230	291	340	423
31	111	160	244	243	244	257	252	318	367	457
32	115	171	268	268	273	282	277	349	399	491
33	120	183	293	295	302	311	306	378	433	525
34	126	196	320	325	334	342	338	410	469	561
35	131	210	351	356	367	374	370	442	507	597
36	136	226	381	388	403	408	405	475	545	631
37	144	243	410	421	439	442	439	511	583	664
38	151	259	439	451	471	477	471	545	622	696
39	158	273	468	484	505	513	505	583	664	729
40	167	289	493	518	541	549	540	619	707	761
41	174	306	518	552	579	586	574	655	750	792
42	181	320	545	586	615	622	610	691	790	824
43	190	336	570	617	649	657	644	727	828	855
44	198	352	597	649	682	691	676	759	865	885
45	205	370	624	680	718	725	711	792	900	914
46	214	387	649	709	750	757	745	822	936	946
47	223	403	675	739	781	790	777	855	973	979
48	230	419	700	766	810	820	808	885	1011	1011
49	241	437	725	793	838	849	837	914	1047	1044
50	248	455	748	820	865	878	867	945	1081	1074
51	257	471	774	846	892	905	896	975	1117	1105

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Time (min)	TC #301 (°F)	TC #302 (°F)	TC #303 (°F)	TC #304 (°F)	TC #305 (°F)	TC #306 (°F)	TC #307 (°F)	TC #308 (°F)	TC #309 (°F)	TC #310 (°F)
0	73	73	73	73	73	72	73	73	73	73
1	73	73	73	73	72	72	72	72	73	73
2	73	75	74	73	73	73	73	73	73	73
3	75	78	78	74	74	73	73	73	73	74
4	77	83	84	78	77	73	73	73	74	76
5	81	87	90	82	80	75	73	73	76	79
6	85	92	97	87	84	76	73	74	78	82
7	90	98	103	93	88	78	74	75	80	86
8	96	105	110	98	92	80	75	76	81	88
9	103	113	117	104	97	82	76	76	83	91
10	111	121	126	112	103	85	77	77	85	94
11	119	130	136	120	109	88	78	78	87	97
12	128	139	144	128	114	92	79	78	89	101
13	136	147	151	135	120	95	80	79	91	105
14	144	155	157	142	126	99	82	80	94	111
15	151	162	162	147	131	102	84	81	98	117
16	158	171	167	152	135	106	86	83	101	123
17	163	180	170	156	139	109	87	84	105	129
18	169	194	174	161	143	112	89	86	110	136
19	175	213	177	165	147	115	91	88	114	142
20	180	229	181	168	150	118	93	90	119	148
21	186	245	186	172	156	122	94	92	123	153
22	194	261	193	178	163	125	96	95	127	158
23	205	277	210	186	174	130	98	97	131	160
24	219	294	240	197	187	135	100	99	134	163
25	238	314	270	213	203	140	103	102	137	164
26	263	337	303	235	223	148	106	104	139	165
27	290	364	339	262	246	157	109	106	141	167
28	320	392	375	294	272	168	113	108	143	170
29	352	421	410	327	298	181	118	110	146	176
30	386	452	446	361	325	195	123	112	149	185
31	420	483	481	396	354	211	129	115	155	197
32	453	516	515	431	382	227	136	118	161	210
33	487	548	549	465	412	245	143	121	168	225
34	521	581	584	500	443	264	151	125	177	243
35	556	613	619	534	472	283	159	129	187	265
36	590	645	652	569	499	302	168	133	198	290
37	624	676	685	603	529	322	177	138	213	319
38	656	705	718	637	561	344	187	144	229	349
39	688	734	750	670	593	366	197	150	247	381
40	720	763	782	703	627	390	208	157	266	413
41	751	791	812	735	660	415	219	164	286	446
42	781	819	841	766	691	439	231	172	307	479
43	811	847	870	797	721	463	242	181	329	512
44	840	874	899	827	749	488	255	190	350	546
45	869	901	929	856	776	512	267	199	373	582
46	898	928	959	885	803	536	280	209	397	619
47	927	957	988	914	829	559	293	220	421	658
48	958	986	1016	943	855	583	306	231	446	698
49	988	1015	1044	972	881	607	318	243	472	740
50	1019	1043	1072	1001	908	631	331	255	499	782
51	1048	1070	1098	1030	936	655	344	267	526	823

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Time (min)	TC #301 (°F)	TC #302 (°F)	TC #303 (°F)	TC #304 (°F)	TC #305 (°F)	TC #306 (°F)	TC #307 (°F)	TC #308 (°F)	TC #309 (°F)	TC #310 (°F)
52	1078	1097	1124	1059	964	679	357	280	554	865
53	1107	1125	1152	1089	993	705	371	294	583	906
54	1136	1153	1181	1119	1022	732	384	307	612	945
55	1165	1181	1211	1150	1052	757	399	321	639	979
56	1194	1211	1242	1182	1083	784	413	335	666	1005
57	1225	1242	1275	1215	1116	812	427	348	690	1026
58	1257	1275	1308	1248	1151	840	443	362	713	1048
59	1291	1310	1341	1282	1187	869	458	374	733	1069
60	1327	1345	1371	1314	1223	898	475	387	753	1089
Max Temp:	1327	1345	1371	1314	1223	898	475	387	753	1089
Max Allowed:	398	398	398	398	398	397	398	398	398	398

Time (min)	TC #311 (°F)	TC #312 (°F)	TC #313 (°F)	TC #314 (°F)	TC #315 (°F)	TC #316 (°F)	TC #317 (°F)	TC #318 (°F)	TC #319 (°F)	TC #320 (°F)
0	73	73	73	72	72	72	72	72	73	73
1	73	73	73	73	73	73	73	73	73	73
2	73	75	76	78	73	73	73	73	73	73
3	76	80	83	84	76	73	74	74	74	74
4	81	87	89	89	81	75	76	77	76	76
5	86	93	93	94	86	78	79	81	80	78
6	90	97	98	98	92	82	83	85	84	83
7	94	101	103	104	97	86	88	89	88	87
8	98	105	109	111	102	91	92	93	93	93
9	101	110	115	119	108	96	97	98	98	98
10	105	116	123	128	114	101	102	103	103	103
11	110	123	131	136	121	108	108	109	108	109
12	115	130	139	145	129	115	115	115	114	115
13	122	138	148	153	137	122	122	122	121	120
14	128	145	157	163	146	130	130	130	128	126
15	135	153	167	174	154	139	138	138	135	133
16	142	160	178	185	162	147	146	145	143	140
17	149	168	189	195	169	155	153	153	150	146
18	156	178	202	206	174	163	159	160	157	153
19	162	190	214	217	179	169	165	165	163	158
20	169	201	227	228	183	174	170	171	169	164
21	176	213	240	240	187	178	173	175	173	168
22	182	225	252	251	192	181	176	178	176	171
23	188	238	265	262	198	184	178	181	178	174
24	196	250	278	274	206	186	181	185	179	176
25	204	264	290	285	216	190	188	194	181	178
26	213	277	303	298	228	199	199	204	184	179
27	223	292	316	311	242	212	210	214	190	179
28	234	306	330	325	260	226	221	224	198	181
29	248	323	345	340	280	243	234	236	206	184
30	265	341	362	357	302	262	248	248	216	195
31	285	361	380	375	326	283	264	262	227	209
32	308	384	401	396	351	308	282	279	240	225
33	334	409	424	420	378	337	302	298	255	243
34	362	435	450	446	408	371	327	318	271	264
35	392	464	477	474	441	411	357	341	292	292
36	424	494	507	504	478	456	393	368	316	326
37	458	526	538	537	516	508	434	399	347	369
38	492	558	571	571	559	576	480	433	384	419
39	528	593	606	611	608	661	532	471	430	474
40	565	630	643	652	661	762	593	514	481	533
41	603	668	682	696	722	889	662	560	534	596
42	643	707	722	743	793	1030	742	613	587	663
43	685	748	765	795	869	1137	824	674	645	734
44	729	791	811	851	939	1199	906	751	706	803
45	774	836	861	914	1007	1264	981	838	771	875
46	821	883	914	974	1071	1319	1056	933	843	949
47	868	932	967	1030	1129	1374	1133	1020	929	1030
48	916	980	1019	1083	1184	1424	1208	1083	1025	1114
49	965	1029	1070	1134	1237	1464	1265	1117	1123	1192
50	1012	1077	1117	1179	1283	1506	1294	1143	1193	1246
51	1057	1120	1155	1216	1322	1537	1321	1198	1202	1257

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Time (min)	TC #311 (°F)	TC #312 (°F)	TC #313 (°F)	TC #314 (°F)	TC #315 (°F)	TC #316 (°F)	TC #317 (°F)	TC #318 (°F)	TC #319 (°F)	TC #320 (°F)
52	1099	1158	1190	1253	1361	1576	1358	1245	1237	1292
53	1134	1187	1224	1290	1396	1598	1389	1272	1283	1329
54	1162	1215	1257	1325	1430	1623	1414	1298	1329	1361
55	1184	1244	1289	1357	1463	1650	1437	1334	1367	1386
56	1202	1274	1320	1387	1492	1664	1460	1369	1393	1410
57	1223	1301	1349	1416	1517	1678	1484	1402	1407	1436
58	1245	1326	1376	1442	1540	1691	1513	1432	1421	1464
59	1266	1351	1403	1468	1563	1701	1550	1460	1445	1491
60	1287	1375	1429	1493	1583	1712	1585	1486	1471	1515
Max Temp:	1287	1375	1429	1493	1583	1712	1585	1486	1471	1515
Max Allowed:	398	398	398	397	397	397	397	397	398	398

Time (min)	TC #321 (°F)	TC #322 (°F)	TC #323 (°F)	TC #324 (°F)	TC #325 (°F)	TC #326 (°F)	TC #327 (°F)	TC #328 (°F)	TC #329 (°F)	TC #330 (°F)
0	73	73	73	72	72	72	72	72	72	73
1	74	73	73	72	72	72	78	76	78	79
2	75	74	73	72	72	72	82	78	87	86
3	76	75	74	73	72	72	79	76	84	86
4	77	76	75	73	73	73	77	76	80	82
5	79	79	77	73	73	73	76	76	78	80
6	82	81	78	73	73	73	76	76	78	79
7	86	83	80	74	73	73	76	76	77	78
8	91	86	81	75	74	74	77	76	77	78
9	95	89	83	75	74	74	77	77	77	78
10	100	93	85	76	74	74	78	77	77	78
11	106	96	88	77	75	75	78	77	77	78
12	111	100	90	78	75	75	78	78	77	78
13	117	105	93	79	75	75	78	79	78	78
14	124	110	97	80	75	75	78	80	78	78
15	131	115	101	81	76	75	80	81	78	79
16	137	121	105	83	76	76	80	82	79	80
17	143	126	109	84	76	76	82	83	80	81
18	150	132	113	86	76	76	83	85	81	83
19	155	137	118	87	77	77	84	86	82	82
20	160	142	122	89	78	77	86	87	83	83
21	164	146	125	91	78	78	87	89	84	84
22	167	149	129	93	79	78	88	89	86	86
23	170	152	132	94	79	79	89	90	87	87
24	172	155	134	96	80	80	91	91	88	89
25	175	158	137	98	81	80	92	92	89	90
26	178	160	140	100	81	81	92	93	90	91
27	182	163	143	102	82	83	93	94	92	92
28	190	167	147	104	83	84	94	95	91	93
29	200	171	151	106	84	86	95	97	92	95
30	211	178	155	108	86	88	97	99	93	102
31	229	187	160	110	87	90	99	102	95	108
32	253	199	166	113	89	92	102	105	98	113
33	284	215	175	116	94	98	105	110	101	115
34	325	234	183	119	102	108	109	113	104	114
35	378	259	193	122	104	109	112	116	107	115
36	444	289	206	126	105	111	115	119	109	118
37	516	326	220	131	106	113	118	122	111	123
38	592	367	236	136	107	116	122	126	116	131
39	676	413	256	142	109	118	125	129	123	143
40	773	464	277	148	111	121	129	132	134	161
41	880	519	302	156	113	123	132	136	152	192
42	975	580	330	165	114	125	136	139	191	245
43	1051	644	360	174	116	128	140	142	204	287
44	1116	711	394	186	118	130	144	146	207	309
45	1173	783	431	198	119	131	147	149	209	327
46	1223	851	470	211	121	133	151	152	212	346
47	1267	908	511	226	123	135	155	155	217	364
48	1307	960	552	241	125	138	158	158	223	383
49	1334	1010	593	257	128	140	162	162	230	404
50	1366	1056	635	274	130	143	166	166	236	421
51	1399	1096	677	291	133	146	170	169	243	437

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Time (min)	TC #321 (°F)	TC #322 (°F)	TC #323 (°F)	TC #324 (°F)	TC #325 (°F)	TC #326 (°F)	TC #327 (°F)	TC #328 (°F)	TC #329 (°F)	TC #330 (°F)
52	1433	1134	719	308	135	148	174	173	249	451
53	1463	1170	761	325	138	151	179	176	256	463
54	1489	1202	801	343	141	153	184	180	265	475
55	1513	1234	840	360	144	156	188	184	275	486
56	1535	1263	877	378	147	160	193	187	288	497
57	1557	1289	909	397	151	163	197	191	302	507
58	1579	1315	940	414	154	166	201	195	314	516
59	1599	1339	967	431	157	169	205	199	327	527
60	1617	1360	994	448	161	173	209	202	341	537
Max Temp:	1617	1360	994	448	161	173	209	202	341	537
Max Allowed:	398	398	398	397	397	397	397	397	397	398

Time (min)	TC #331 (°F)	TC #332 (°F)	TC #333 (°F)	TC #334 (°F)	TC #335 (°F)
0	73	73	73	73	73
1	78	80	75	79	75
2	84	84	77	89	78
3	79	80	78	84	77
4	77	78	78	81	78
5	77	78	79	80	79
6	76	78	79	80	80
7	76	79	80	80	80
8	76	79	80	81	80
9	76	79	81	81	81
10	76	80	82	81	81
11	76	81	83	81	82
12	76	83	84	81	83
13	77	84	85	82	84
14	77	86	86	82	85
15	78	87	88	82	86
16	78	89	89	83	87
17	79	91	91	84	89
18	80	94	92	84	90
19	82	98	93	85	91
20	84	100	95	86	92
21	86	101	96	87	93
22	88	102	98	89	93
23	89	102	100	90	94
24	90	102	103	91	95
25	91	103	108	93	98
26	92	103	112	94	101
27	93	105	117	95	104
28	95	107	122	97	108
29	97	111	127	99	112
30	100	115	132	101	117
31	103	120	137	103	121
32	107	125	142	107	126
33	111	129	147	111	131
34	114	134	153	115	136
35	118	139	158	120	141
36	122	144	164	125	148
37	127	149	170	131	154
38	131	154	176	140	161
39	136	160	182	150	168
40	140	165	188	162	175
41	145	170	194	185	184
42	149	176	200	238	192
43	154	181	206	293	199
44	157	186	213	346	208
45	162	192	219	384	216
46	166	197	225	416	226
47	171	203	232	443	235
48	176	209	238	467	245
49	181	215	245	490	254
50	186	221	253	509	263
51	191	227	259	525	271

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Time (min)	TC #331 (°F)	TC #332 (°F)	TC #333 (°F)	TC #334 (°F)	TC #335 (°F)
52	195	232	266	535	278
53	200	238	274	544	286
54	204	243	282	550	294
55	209	248	290	557	302
56	213	254	298	568	310
57	217	259	304	580	317
58	221	265	312	592	325
59	226	271	318	607	332
60	230	278	325	627	339
Max Temp:	230	278	325	627	339
Max Allowed:	398	398	398	398	398